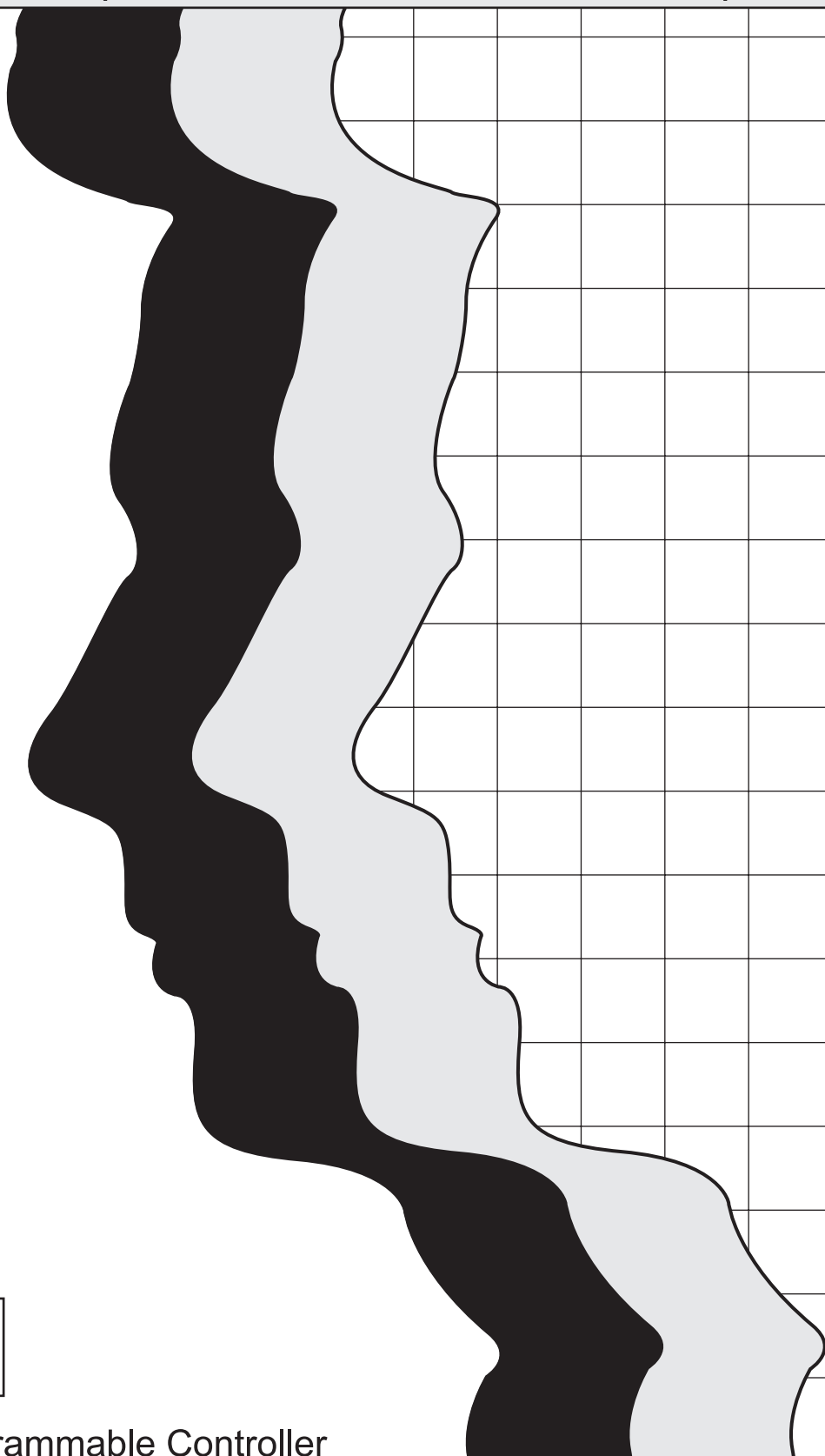# MITSUBISHI

Type Q80BD-J61BT11N/Q81BD-J61BT11 CC-Link System
Master/Local Interface Board

User's Manual (For SW1DNC-CCBD2-B)

MELSEC

Mitsubishi Programmable Controller

• SAFETY PRECAUTIONS •

(Be sure to read these instructions before using the product.)

Before using this product, read this manual and the relevant manuals introduced in this manual carefully and handle the product correctly with full attention to safety.
Note that these precautions apply only to this product. Refer to the user's manual of the CPU module for safety precautions on programmable controller systems.
In this manual, the safety instructions are ranked as "⚠ WARNING " and "⚠CAUTION".

⚠ WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Note that failure to observe the ⚠CAUTION level instructions may also lead to serious results depending on the circumstances.
Be sure to observe the instructions of both levels to ensure personal safety.

Please keep this manual in accessible place and be sure to forward it to the end user.

[DESIGN PRECAUTIONS]

⚠ WARNING

- For details on the operating status of each station when a communication problem occurs in the data link, refer to Chapter 5 of this manual.
- If a cable dedicated to the CC-Link is disconnected, this may destabilize the line, and a data link communication error may occur in multiple stations. Make sure to create an interlock circuit in the sequence program so that the system will operate safely even if the above error occurs. Failure to do so may result in a serous accident due to faulty output or malfunctions.
- When performing the control of the personal computer in operation (changing data), configure an interlock circuit in a user program so the safety of the overall system is always maintained. When performing other controls of the personal computer in operation (changing program and operation status (status control)), read this manual carefully and confirm if the overall safety is maintained.
  Especially, when this control is performed to a remote personal computer from an external device, problems that have occurred on the personal computer side may not be able to immediately be handled if there is a data communication error.
  Define a troubleshooting agreement between external devices and the personal computer for data communication error occurrences, as well as construct an interlock circuit in the user program.
- Do not write any data from the user program into the "system area" of the board buffer memory. Writing data into the "system area" may cause a CC-Link system malfunction.
- A failure in the board may cause remote I/O not to turn on or off correctly. For critical I/O signals that may cause a serious accident, establish a circuit to externally monitor them.

[DESIGN PRECAUTIONS]

⚠ CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100mm (3.94 in.) or more from each other.
  Not doing so could result in noise that may cause malfunction.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION

- Use the board in an environment that meets the general specifications contained in this user's manual.
  Using this board in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.

- Do not directly touch the conductive area or electronic components of the board.
  Doing so may cause malfunction or failure in the board.
- Fix the board by tighten the board-fixing screws within the specified torque range.
  Under tightening may cause drop of the component or wire, short circuit, or malfunction.
  Over tightening may damage the screw and/or module, resulting in drop, short circuit, or malfunction.
  For the tightening torque of the board fixing screws, refer to the manual supplied with the personal computer.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the board.
  Failure to do so may cause a failure or malfunctions of the board.
- Be sure to shut off all phases of the external power supply used by the system before installing or removing the board. If all power is not turned off, not doing so may cause damage to the product.
- Securely mount the board to the PCI bus slot of the mounting device.
  If the board is not mounted correctly, this may lead to malfunctioning, failure or cause the board to fall.
- When mounting the board, take care not to become injured by the components that are installed or surrounding materials.
- When installing the board, take care not to contact with other boards.
- While handling the board, be sure to keep it free of static electricity.
  Static electric charges may damage the board or result in malfunction.
- Be sure to turn off the power supply to the applicable station before installing or removing the terminal block.
  If the terminal block is installed or removed without turning off the power supply to the applicable station, correct data transmission cannot be guaranteed.
- Do not drop the board and the terminal block or subject it to any excessive shock.
  It may damage the board and the terminal block or result in malfunction.

[WIRING PRECAUTIONS]

⚠ CAUTION

• Be sure to shut off all phases of the external power supply used by the system before installing or removing the board and wiring.
  Not doing so may cause damage to the product.
• When turning on the power and operating the module after installation and wiring, always attach the computer's main cover.
  Failure to do so may cause an electric shock.
• When turning on the power and operating the module after wiring is completed, always attach the terminal cover that comes with the product.
  There is a risk of malfunction if the terminal cover is not attached.
• Always ground the SLD terminal of the board and the personal computer to the protective ground conductor.
  Not doing so can cause a malfunction.
• Tighten the terminal screws within the range of specified torque.
  If the terminal screws are loose, it may cause short circuits or malfunction.
  If the terminal screws are tightened too much, it may cause damage to the screw and/or the board, resulting in short circuits or malfunction.
• Prevent foreign matter such as swarf or wire chips from being attached onto the board.
  Failure to do so may cause fires, failure or malfunction.
• Be sure to fix the wires or cables connected to the board by placing them in a duct or clamping them.
  If not fixed, cables may be dangled and accidentally pulled, causing damage to the board and cables and malfunction due to bad cable contacts.
• Do not install the control lines together with the communication cables, or bring them close to each other. Doing so may cause malfunctions due to noise.
• When removing the communication cable or power supply cables from the board, do not pull the cable.
  First loosen the screws where the cable is connected to the board and then remove the cable. Pulling the cable that is connected to the board may cause damage to the board and cable or malfunction due to bad cable contacts.
• Solderless terminals with insulation sleeve cannot be used for the terminal block. It is recommended that the wiring connecting sections of the solderless terminals will be covered with a marking tube or an insulation tube.
• Be sure to turn off the power supply to the applicable station before installing or removing the terminal block.
  If the terminal block is installed or removed without turning off the power supply to the applicable station, correct data transmission cannot be guaranteed.

[WIRING PRECAUTIONS]

⚠ CAUTION

- Always make sure to power off the system in advance when removing the terminating resistor to charge the system. If the terminating resistor is removed and mounted while the system is energized, normal data transmission will not be guaranteed.
- Use applicable solderless terminals and tighten them with the specified torque.
  If any solderless spade terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Be sure to tighten any unused terminal screws within a tightening torque range (0.59 to 0.88N·m).
  Failure to do so may cause a short circuit due to contact with a solderless terminal.

[START UP AND MAINTENANCE PRECAUTIONS]

⚠ CAUTION

- Do not dismantle or rebuild the board.
  Doing so could cause failure, malfunction, injury or fire.
- Be sure to shut off all phases of the external power supply used by the system before installing or removing the board.
  Not doing so may cause failure or malfunction of the board.
- Do not touch the terminal while the power is on.
  Doing so may cause malfunction.
- Be sure to shut off all phases of the external power supply used by the system before cleaning or retightening the terminal screws or module mounting screws.
  Not doing so may cause damage to the product.
- Fix the board by tighten the board-fixing screws within the specified torque range.
  Under tightening may cause drop of the component or wire, short circuit, or malfunction.
  Over tightening may damage the screw and/or module, resulting in drop, short circuit, or malfunction.
  For the tightening torque of the board fixing screws, refer to the manual supplied with the personal computer.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the board.
  Failure to do so may cause a failure or malfunctions of the board.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

• CONDITIONS OF USE FOR THE PRODUCT •

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
 i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
 ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
 MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
 ("Prohibited Application")
 Prohibited Applications include, but not limited to, the use of the PRODUCT in;
 • Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
 • Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
 • Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

 Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

REVISIONS

Print Date	∗ Manual Number	Revision
Jun., 2005	SH (NA)-080527ENG-A	First Printing
Nov., 2005	SH (NA)-080527ENG-B	Correction Section 2.2.1, Section 8.4.1, Section 8.4.3, Chapter 9, Section 17.1.1
Jun., 2006	SH (NA)-080527ENG-C	Correction Section 2.2.4, Section 3.2, Section 8.6, Section 17.2.1
Mar., 2007	SH (NA)-080527ENG-D	Correction Generic Terms and Abbreviations, Section 2.2.1, Section 8.4.1, Section 10.1.2, Section 11.2, Section 11.4, Section 11.8 Addition Section 11.3.5, Section 11.3.6, Section 11.7
Oct., 2007	SH (NA)-080527ENG-E	Correction Generic Terms and Abbreviations, Section 1.1, Section 1.3, Section 2.2.1, Section 4.2.3, Chapter 7, Section 8.4.1, Section 9.1, Section 11.3, Section 17.1.4, Section 17.2.1, Section 17.3.1, Appendix 3.2 Section 8.4.2 to 8.4.3 changed to Section 8.4.3 to 8.4.4 Addition Section 8.4.2, Appendix 7
Jan., 2008	SH (NA)-080527ENG-F	Correction Precautions for use, Generic Terms and Abbreviations, Chapter 1, Section 2.2, Section 2.2.1, Section 2.2.3, Section 3.1, Section 4.2.1, Section 4.2.2, Section 4.2.3, Section 4.2.4, Section 4.4.5, Section 5.2, Section 5.2.2, Section 5.2.3, Section 5.2.4, Section 5.3, Section 5.3.1, Section 5.3.2, Section 6.1, Section 7.1.1, Section 7.1.2, Section 8.2.1, Section 8.2.2, Section 8.4.1, Section 8.6, Section 9.3.6, Section 9.3.7, Section 9.3.8, Section 9.3.11, Section 10.1.1, Section 10.1.2, Section 12.2.1, Section 12.5.1, Section 13.1.2, Section 13.2.2, Section 14.1.2, Section 14.2.2, Section 15.2.1, Section 16.2.1, Section 17.1.4, Section 17.2.1, Section 17.6, Appendix 3.1.2, Appendix 3.1.3

Print Date	∗ Manual Number	Revision
May, 2008	SH (NA)-080527ENG-G	Model addition Q81BD-J61BT11 Correction Precautions for use, Generic Terms and Abbreviations, Product List, Section 1.1, Section 1.3, Section 2.1, Section 2.2.1, Section 2.2.2, Section 2.2.3, Section 2.2.4, Section 3.1, Section 3.2, Section 4.4.7, Section 5.2, Section 8.3, Section 8.4.1, Section 8.4.3, Section 8.4.4, Section 8.6, Section 8.7.2, Section 9.1.1, Section 10.1.2, Section 11.3, Section 12.1, Section 12.5.2, Section 13.1.1, Section 13.1.5, Section 13.2.1, Section 13.2.5, Section 14.1.1, Section 14.1.5, Section 14.2.1, Section 14.2.5, Section 15.1, Section 15.5.2, Section 16.1, Section 16.5.2, Section 17.1.3, Section 17.3.1, Section 17.3.2, Appendix 1.1, Appendix 1.2, Appendix 2.3, Appendix 3, Appendix 3.2 Addition Appendix 8.1, Appendix 8.2
Sep., 2008	SH (NA)-080527ENG-H	Correction Section 3.2
Oct., 2008	SH (NA)-080527ENG-I	Correction Generic Terms and Abbreviations, Section 3.3, Section 10.1.2
Jul., 2009	SH (NA)-080527ENG-J	Correction Chapter 7, Appendix 7,1, Appendix 8.1, Appendix 8.2
Oct., 2009	SH (NA)-080527ENG-K	Correction Section 2.2.1, Section 8.4.1, Section 10.1.2, Section 11.4, Section 17.1.1, Section 17.2.1, Section 17.3.1, Appendix 4.1, Appendix 4.2

Print Date	＊ Manual Number	Revision
May, 2010	SH (NA)-080527ENG-L	**Correction** SAFETY PRECAUTIONS, Generic Terms and Abbreviations, Section 1.1, Section 2.2.1, Section 3.1, Section 8.2.1, Section 8.3, Section 8.4, Section 8.6, Section 10.2.1, Section 11.3.3, Section 11.3.4, Section 11.9, Appendix 7 Section 1.3 changed to Appendix 8 Appendix 8 to 9 changed to Appendix 9 to 10 **Addition** CONDITIONS OF USE FOR THE PRODUCT **Deletion** Section 11.3.5, Section 11.3.6
Dec., 2010	SH (NA)-080527ENG-M	**Correction** Section 2.2.1
May, 2011	SH (NA)-080527ENG-N	**Correction** Precautions for use, Manuals, Product List, Appendix 2.3, Appendix 7.2

Japanese Manual Version SH-080526-N

Precautions for use

(1) Operating environment of the personal computer used
Refer to Section 2.2 Applicable Systems in this manual.

(2) When using the CC-Link Ver.2 board as a standby master station
Refer to Section 2.2.2 for combinations of modules when using the CC-Link Ver.2 board as a standby master station.

(3) When using the CC-Link Ver.2 board as a master station
When using the CC-Link Ver.2 board as a master station, any of local modules cannot be used as a standby master station.

(4) Restrictions on the CC-Link Ver.2 board installation
Installing the CC-Link Ver.2 board and CC-Link Ver.1 board to the same computer and using both of them is not allowed.

(5) Multi-thread communication
The MELSEC data link library cannot be accessed from multiple threads within the same process.
Access the MELSEC data link library with a single thread.

(6) Service applications
The MELSEC data link library cannot be accessed from Windows® Service applications.
Access the MELSEC data link library from a user application.

(7) Installation
When a CC-Link Ver.2 board is used on a personal computer in which SWnDNF-CCLINK has been installed, uninstall SWnDNF-CCLINK first, then install the SW1DNC-CCBD2-B that is provided with the CC-Link Ver.2 board.

(8) Overwrite installation
When performing an overwrite installation, install the program in the same folder in which the previous program is installed.

(9) Start menu
After the utility software is uninstalled, the program name may still be displayed in the Start menu.
In this case, restart the personal computer.

(10) Software versions of the CC-Link system master and local modules
When reading/writing data from/to other stations using the transient transmission function in the CC-Link system, use the following software version for the CC-Link master and local modules to be accessed.

Model name	Software version	Remark
QJ61BT11N	Any of the versions of the module can be used.	—
QJ61BT11		
AJ61QBT11	Version N or later	Not accessible if the software version is M or earlier.
A1SJ61QBT11		
AJ61BT11		
A1SJ61BT11		

(11) Multiprocessor-based personal computers
For details on the compatible operating system and driver software version when using multiprocessor-based personal computers, refer to Section 2.2.1.

(12) Compatibility with the hyper-threading technology
For details on the compatible operating system and driver software version when using the hyper-threading technology on the personal computer, refer to Section 2.2.1.

(13) Transient transmission functions of the CC-Link board
Transient transmission is not allowed to slave station No.64 on the CC-Link system.

(14) Performance
The system performance using the CC-Link Ver.2 board differs according to the performance/loaded condition of the personal computer, the processing contents of the application software, and the type of the interface board. Use the product after reviewing the system configuration and processing contents of the software in advance.
For details of the CC-Link Ver.2 board performance, refer to Chapter 5, DATA LINK PROCESSING TIMES.

(15) Combination of ROM version and S/W version
When using CC-Link Ver.2 board ROM version 2B or later, use S/W package version 1.06G or later.

INTRODUCTION

Thank you for purchasing the Type Q80BD-J61BT11N/Q81BD-J61BT11 CC-Link System Master/Local Interface Board.
Please read this manual thoroughly to fully understand the functions and performances of the Type Q80BD-J61BT11N/Q81BD-J61BT11 CC-Link System Master/Local Interface Board in order to use the product properly.
Please be sure to deliver this manual to the end users.

CONTENTS

10 ACCESSIBLE DEVICES AND RANGES   10- 1 to 10- 4

11 MELSEC DATA LINK LIBRARY   11- 1 to 11-18

12 COMMUNICATION BETWEEN THE MASTER STATION AND REMOTE I/O STATIONS   12- 1 to 12- 8

APPENDIX	App- 1 to App-55

INDEX	Index- 1 to Index- 3

Manuals

The following table lists the manuals relevant to this product.
You can order them as necessary.

Relevant Manuals

Manual Name	Manual Number (Model Code)
CC-Link System Master/ Local Module type QJ61BT11N User's Manual This Manual explains the system configuration, Performance specifications, functions, handling, wiring and troubleshooting for the QJ61BT11N. (Sold separately)	SH-080394 (13JR64)
CC-Link System Master/ Local Module type AJ61BT11/A1SJ61BT11 User's Manual This Manual explains the system configuration, Performance specifications, functions, handling, wiring and troubleshooting for the AJ61BT11 and A1SJ61BT11. (Sold separately)	IB-66721 (13J872)
CC-Link System Master/ Local Module type AJ61QBT11/A1SJ61QBT11 User's Manual This Manual explains the system configuration, Performance specifications, functions, handling, wiring and troubleshooting for the AJ61QBT11 and A1SJ61QBT11. (Sold separately)	IB-66722 (13J873)
MELSEC-L CC-Link System Master/ Local Module User's Manual This Manual explains the system configuration, Performance specifications, functions, handling, wiring and troubleshooting for the L series master/local module. (Sold separately)	SH-080895 (13JZ41)

REMARK

Manuals in printed form are sold separately for single purchase. Order a manual by quoting the manual number (model code) listed in the table above.

<u>How to Use this Manual</u>

The following lists the key items that represent the main usage of the CC-Link Ver.2 board by the purpose. Please use the following key items to refer to the appropriate section of this manual.

(1) To learn about the features of the CC-Link Ver.2 board (Section 1.1)

The features are described in Section 1.1.

(2) To learn about the system configuration (Chapter 2)

The system configuration using the CC-Link Ver.2 board is described in Chapter 2.

(3) To learn about the operating environment of the CC-Link Ver.2 board (Section 2.2.1)

The operating environment of the CC-Link Ver.2 board is described in Section 2.2.1.

(4) To learn about specifications of the CC-Link Ver.2 board (Chapter 3)

The specifications of the CC-Link Ver.2 board are described in Chapter 3.

(5) To learn about the functions of the CC-Link Ver.2 board (Chapter 4)

The functions of the CC-Link Ver.2 board are described in Chapter 4.

(6) To learn about the data link processing time (Chapter 5)

The data link processing time is described in Chapter 5.

(7) To learn about how to set parameters (Chapter 6)

How to set parameters is described in Chapter 6.

(8) To learn about the conformation to the EMC Directive (Chapter 7)

Conformation to the EMC Directive is described in Chapter 7.

(9) To learn about the CC-Link Ver.2 board settings (Chapter 8)

The CC-Link Ver.2 board settings are described in Chapter 8.

(10) To learn about how to install and uninstall utility software (Section 8.4)

How to install and uninstall utility software is described in Section 8.4.

(11) To learn about the utility software operating procedures (Chapter 9)

The utility software operating procedures are described in Chapter 9.

(12) To learn about accessible devices and ranges (Chapter 10)

The device specifications and the contents of the information stored in the system area are described in Chapter 10.

(13) To learn about how to use the functions (Chapter 11)

How to use the functions is described in Chapter 11.

(14) To learn about how to communicate with each station (Chapters 12 to 16)

Some examples of communication between the master board and each station are described in Chapters 12 to 16.

(15) To learn about the actions to take when the system does not operate (Chapter 17)

The troubleshooting procedures are described in Chapter 17.

(16) To learn about the error descriptions (Sections 17.2.1 and 17.3.5)

The descriptions of errors are described in Sections 17.2.1 and 17.3.5.

(17) To learn about combination with existing software (Appendix 8)

Combination with existing software is described in Appendix 8.

Generic Terms and Abbreviations

This manual uses the following generic terms and abbreviations to describe the Model Q80BD-J61BT11N/Q81BD-J61BT11 CC-Link System Master/Local Interface Board, unless otherwise specified.

Generic term/abbreviation	Description of generic term/abbreviation
CC-Link Ver.1 board	Generic term for the Type A80BDE-J61BT11 CC-Link System Master/Local Interface Board and the Type A80BDE-J61BT13 Control & Communication Link System Local Interface Board.
CC-Link Ver.2 board	Abbreviation for the Type Q80BD-J61BT11N/Q81BD-J61BT11 CC-Link System Master/Local Interface Board.
Master board	Abbreviation for the CC-Link board when used as a master station.
Local board	Abbreviation for the CC-Link board when used as a local station.
QJ61BT11(N)	Generic term for QJ61BT11N CC-Link System Master/Local Module and QJ61BT11 CC-Link System Master/Local Module.
Personal computer	PC/AT compatible computer.
Windows NT®	Abbreviation for Microsoft® Windows NT® Workstation 4.0 Operating System.
Windows® 2000	Abbreviation for Microsoft® Windows® 2000 Operating System.
Windows® XP	Generic term for Microsoft® Windows® XP Home Edition Operating System and Microsoft® Windows® XP Professional Operating System.
Windows Vista®	Generic term for Microsoft® Windows Vista® Home Basic Operating System, Microsoft® Windows Vista® Home Premium Operating System, Microsoft® Windows Vista® Business Operating System, Microsoft® Windows Vista® Ultimate Operating System and Microsoft® Windows Vista® Enterprise Operating System.
Windows® 7	Generic term for Microsoft® Windows® 7 Home Premium Operating System, Microsoft® Windows® 7 Professional Operating System, Microsoft® Windows® 7 Ultimate Operating System and Microsoft® Windows® 7 Enterprise Operating System.
Windows Server® 2003 R2	Abbreviation for Microsoft® Windows Server® 2003 R2 Operating System.
Windows Server® 2008	Abbreviation for Microsoft® Windows Server® 2008 Operating System.
Windows Server®	Generic term of Microsoft® Windows Server® 2003 R2 Operating System and Microsoft® Windows Server® 2008 Operating System.
Windows®	Generic term for Windows NT®, Windows® 2000, Windows® XP, Windows Vista®, Windows® 7 and Windows Server®.
AnNCPU	Generic term for A0J2HCPU, A1SCPU, A1SCPU-S1, A1SCPUC24-R2, A1SHCPU, A1SJCPU, A1SJCPU-S3, A1SJHCPU, A1SJHCPU-S8, A1NCPU, A2CCPU, A2CCPUC24, A2CCPUC24-PRF, A2CJCPU, A2NCPU, A2NCPU-S1, A2SCPU, A2SCPU-S1, A2SHCPU, A2SHCPU-S1, A3NCPU, and A1FX.
AnACPU	Generic term for A2ACPU, A2ACPU-S1, A2ACPUP21/R21, A2ACPUP21/R21-S1, A3ACPUP21/R21, and A3ACPU
AnUCPU	Generic term for A2UCPU, A2UCPU-S1, A2ASCPU-S1, A2ASCPU-S30, A2USHCPU-S1, A3UCPU, and A4UCPU
QnACPU	Generic term for Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q3ACPU, Q4ACPU, and Q4ARCPU.
ACPU	Generic term for AnNCPU, AnACPU, and AnUCPU.
QCPU (A mode)	Generic term for Q02CPU-A, Q02HCPU-A, and Q06HCPU-A.
QCPU (Q mode)	Generic term for Q00JCPU, Q00UJCPU, Q00CPU, Q00UCPU, Q01CPU, Q01UCPU, Q02CPU, Q02HCPU, Q02UCPU, Q03UDCPU, Q03UDECPU, Q04UDHCPU, Q04UDEHCPU, Q06HCPU, Q06UDHCPU, Q06UDEHCPU, Q10UDHCPU, Q10UDEHCPU, Q12HCPU, Q12PHCPU, Q12PRHCPU, Q13UDHCPU, Q13UDEHCPU, Q20UDHCPU, Q20UDEHCPU, Q25HCPU, Q25PHCPU, Q25PRHCPU, Q26UDHCPU, Q26UDEHCPU, Q50UDEHCPU and Q100UDEHCPU.
Process CPU	Generic term for Q12PHCPU and Q25PHCPU.
Redundant CPU	Generic term for Q12PRHCPU and Q25PRHCPU.
LCPU	Generic term for L02CPU and L26CPU-BT.
Master station	The station controlling the remote station, local station, and intelligent device station.

Generic term/abbreviation	Description of generic term/abbreviation
Standby master station	Backup station for data link control when the link to the master station is disconnected due to a programmable controller CPU, Master board or power supply problem.
Local station	A station that has a CPU and can communication with the master station and local station.
Remote I/O station	A remote station that can only handle bit information. (AJ65BTB□-□□, AJ65BTC□-□□)
Remote device station	Remote station that can use bit data and word data. (Performs input and output with external devices, and analog data conversion.) (AJ65BT-64AD, AJ65BT-64DAV, AJ65BT-64DAI)
Remote station	Generic term for the remote I/O station and remote device station.
Intelligent device station	A slave station such as the AJ65BT-R2 in the CC-Link system that can perform transient transmission.
Slave station	Generic term for remote I/O station, remote device station, local station, intelligent device station and standby master station.
Ver.1 compatible slave station	Slave station compatible with the remote net ver.1 mode.
Ver.2 compatible slave station	Slave station compatible with the remote net ver.2 mode.
Master and local modules	Generic term for the AJ61QBT11, A1SJ61QBT11, AJ61BT11, A1SJ61BT11, and QJ61BT11.
Master module	Generic term when the AJ61QBT11, A1SJ61QBT11, AJ61BT11, A1SJ61BT11 and QJ61BT11 are used as master stations.
Local module	Generic term for QJ61BT11N, QJ61BT11, AJ61BT11, A1SJ61BT11, AJ61QBT11, and A1SJ61QBT11 when they are used as local stations.
Remote module	Generic term for AJ65BTB□-□□, AJ65BTC□-□□, AJ65BT-64AD, AJ65BT-64DAV, AJ65BT-64DAI, A852GOT, etc.
Intelligent module	Generic term for modules such as the AJ65BT-R2 that can perform transient transmission.
Cyclic transmission	Function that periodically updates the contents of the remote I/O and remote register.
Transient transmission	Function by which data communications are available between 1:1stations at any given timing by specifying a target station.
Remote net mode	Mode that can communicate with all stations used for CC-Link (remote I/O station, remote device station, local station, intelligent device station, and standby master station) The remote net mode has three different modes: remote net ver.1 mode, remote net ver.2 mode, and remote net additional mode.
Remote net ver.1 mode	Mode in which compatibility with the CC-Link Ver.1 board is achieved. Select this mode when the number of cyclic points need not be increased or when the CC-Link Ver.2 board is used to replace the CC-Link Ver.1 board as a maintenance product.
Remote net ver.2 mode	Select this mode when increasing the number of cyclic points and configuring a new system.
Remote net additional mode	Select this mode when adding a ver.2 compatible station to the existing system to increase the number of cyclic points.
SB	Special link relay
SW	Special link register
RX	Remote input
RY	Remote output
RWw	Remote register (write area)
RWr	Remote register (read area)

Product List

The following shows the product list of the CC-Link Ver.2 board.

Item name	Quantity	
	Q80BD-J61BT11N	Q81BD-J61BT11
Type Q80BD-J61BT11N CC-Link System Master/Local Interface Board	1	—
Type Q81BD-J61BT11 CC-Link System Master/Local Interface Board	—	1
Terminal resistor 110Ω, 1/2 W (brown-brown-brown)	2	2
Terminal resistor 130Ω, 1/2 W (brown-orange-brown)	2	2
Type SW1DNC-CCBD2-B CC-Link Utility Software Package(CD-ROM) [1]	1	1
Before Using the Product	1	1
Software License Agreement	1	1

＊1: The CD-ROM contains the User's Manual in PDF format

MEMO

1

1 OVERVIEW

The CC-Link system connects distributed modules such as an I/O module and a special functional module using CC-Link dedicated cables so that these modules can be controlled by the programmable controller CPU.

(1) By distributing each module to facility equipment such as a conveyor line and a machine device, the entire system can be connected in the most efficient manner.

(2) The on/off information of input/output and numeric data handled by modules can easily be sent and received at high speed.

(3) A simple distributed system can be configured by connecting multiple personal computers and programmable controller CPUs.

(4) By connecting various devices made by Mitsubishi's partner manufacturers, the system that can provide flexible solutions to meet a wide range of user needs may be configured.

Master station

Master/local interface board

Remote I/O station

Device manufactured by a partner manufacturer

Remote device station

Remote I/O station

Local station

Intelligent device station

Programmable controller CPU
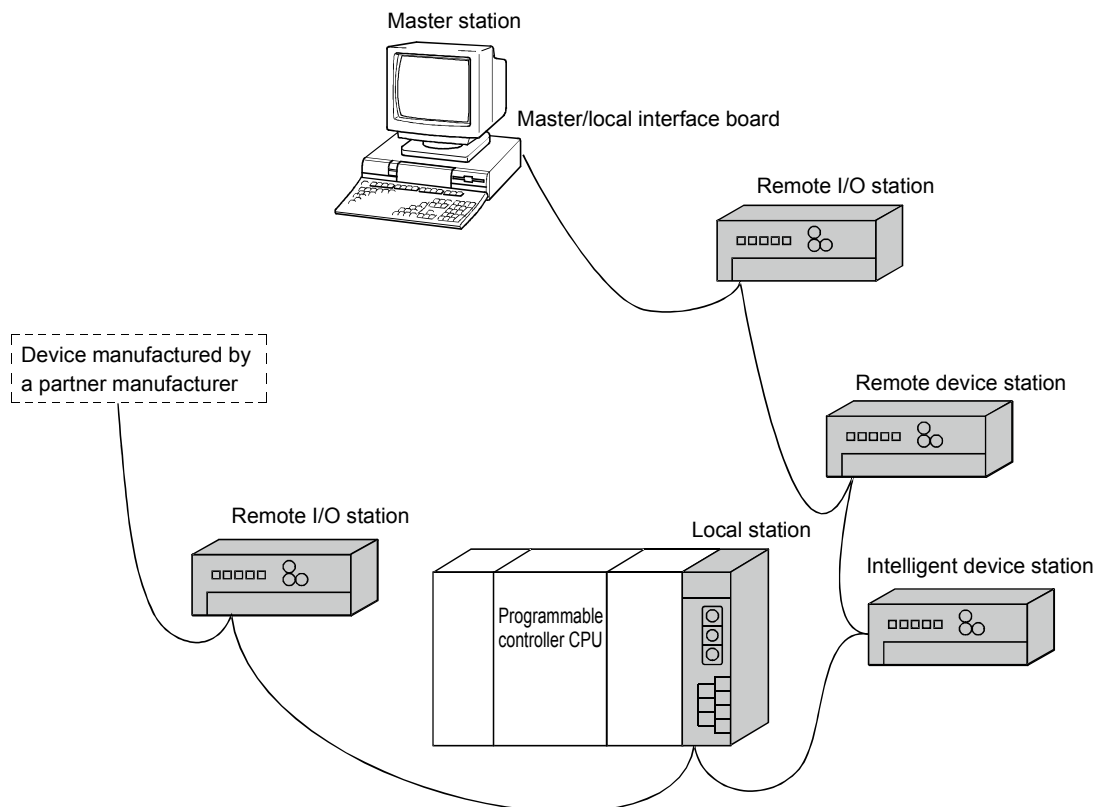
Master station   The station that controls the data link system.
Remote I/O station   A remote station that handles bit unit data only.
Remote device station   A remote station that handles bit unit and word unit data.
Local station   A station having a programmable controller CPU and the ability to communicate with the master and other local stations.
Intelligent device station A station that can perform transient transmission.

When applying the program examples and sample programs explained in this manual to the actual system, make sure that there is no any problem regarding control on the target system.

1

1.1 Features of the CC-Link Ver.2 Board

The features of the CC-Link Ver.2 board are as follows:

(1) **Personal computers can be incorporated into the CC-Link system.**
Installing a CC-Link Ver.2 board into a personal computer allows the PC to be used as a master station, standby master station, or local station compatible with CC-Link Ver.2.
By using the CC-Link Ver.2 board as a master station, Ver.2 compatible remote I/O stations, remote device stations, intelligent device stations and local stations can be controlled from the PC.

(2) **Programs in the CC-Link Ver.1 board can also be used in the CC-Link Ver.2 board.**
Programs developed for the CC-Link Ver.1 board can be used for the CC-Link Ver.2 board.

(3) **Parameters set for the CC-Link Ver.1 board can also be used for the CC-Link Ver.2 board.**
Parameters set for the CC-Link Ver.1 board can be reused for the CC-Link Ver.2 board. (Refer to Appendix 3)

(4) **Using the PCI bus eliminates troublesome switch settings.**
Simply installing the CC-Link board on the PCI bus automatically executes the initial settings.

(5) **Parameters can easily be set.**
The parameters necessary for the operation of the CC-Link system can easily be set with a CC-Link Ver.2 utility program; thus, programming is simplified.

(6) **Test and monitoring information related to the CC-Link system can be displayed.**
The test and monitoring states in the CC-Link system can be easily displayed on a personal computer.

(7) **Support for QCPUs (Q mode) of a multiple CPU system**
By specifying the station number of the logical station number via the CC-Link Ver.2 utility, communication with each QCPU (Q mode) of a multiple CPU system can be performed.

(8) **It provides the functions that support user programming.**
It is possible to perform the remote control of remote I/O stations, remote device stations, intelligent device stations, and local stations, as well as reading and writing of devices using the functions that support Microsoft® Visual C++® and Microsoft® Visual Basic® . Thus, user program can easily be created.
Example:
 Control of the input signal X and output signal Y of a remote I/O station
 Analogue voltage output control of a remote device station (analogue module)
 Communication control of an intelligent device station (RS-232C module)

(9) **It provides the drivers for various operating systems.**
Various drivers are provided for easy system configuration according to the user environment.
For details on the compatible operating system, refer to Section 2.2.1.

1.2 Features of the CC-Link System

This section explains the features of the CC-Link System.

(1) Remote I/O station communication

The on/off status of a switch or indicator lamp is communicated using the remote input RX and remote output RY.
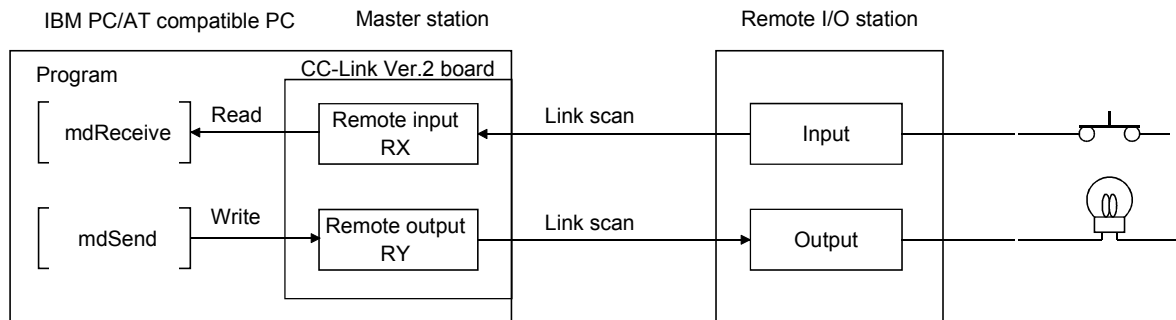
(2) Remote device station communication

Handshaking signals with the remote device station (initial request, error occurred flag, etc.) are communicated using the remote input RX and remote output RY. The setting data to the remote device station are communicated using the remote registers RWw and RWr.
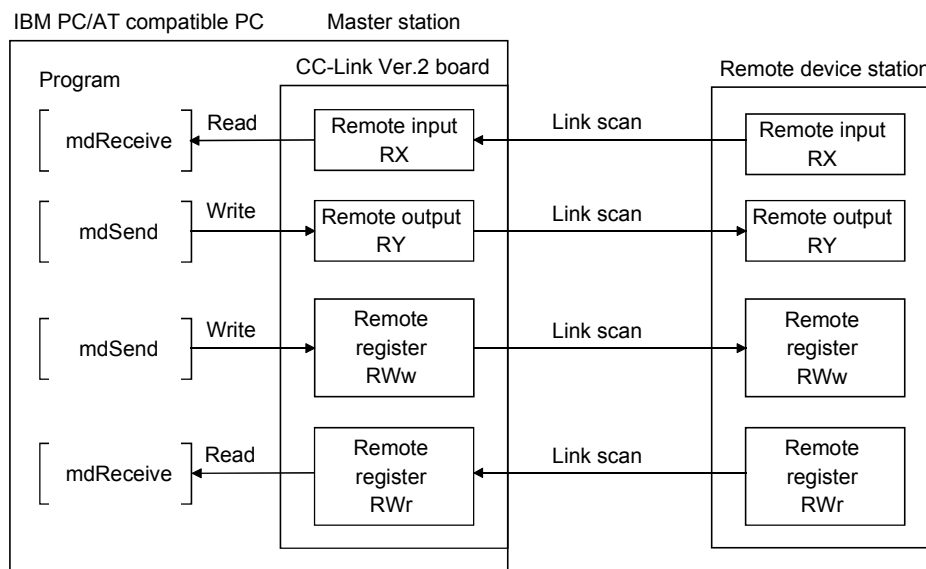
(3) Local station communication

The communication between the master station and the local station uses two types of transmission methods: cyclic transmission and transient transmission.

(a) Cyclic transmission

Data communication between stations can be performed in N : N mode using bit data (remote input RX and remote output RY) and word data (remote registers RWw and RWr).

IBM PC/AT compatible PC   Master station

Program	CC-Link Ver.2 board		Local station	Programmable controller CPU

mdReceive ◄ Read — Remote input RX ◄ Link scan — Remote output RY ◄ Automatic refresh — Y

mdSend — Write ► Remote output RY — Link scan ► Remote input RX — Automatic refresh ► X

mdSend — Write ► Remote register RWw — Link scan ► Remote register RWr — Automatic refresh ► D

mdReceive ◄ Read — Remote register RWr ◄ Link scan — Remote register RWw ◄ Automatic refresh — D

(b) Transient transmission

Read and write operations can be performed for the local station buffer memory and CPU device at an arbitrary timing (using the mdReceive and mdSend functions, respectively).

IBM PC/AT compatible PC   Master station

Program	CC-Link Ver.2 board		Local station	Programmable controller CPU

mdSend — Write — Transient transmission — D

mdReceive — Read — Transient transmission

mdSend — Write — Transient transmission — Buffer memory

mdReceive — Read — Transient transmission
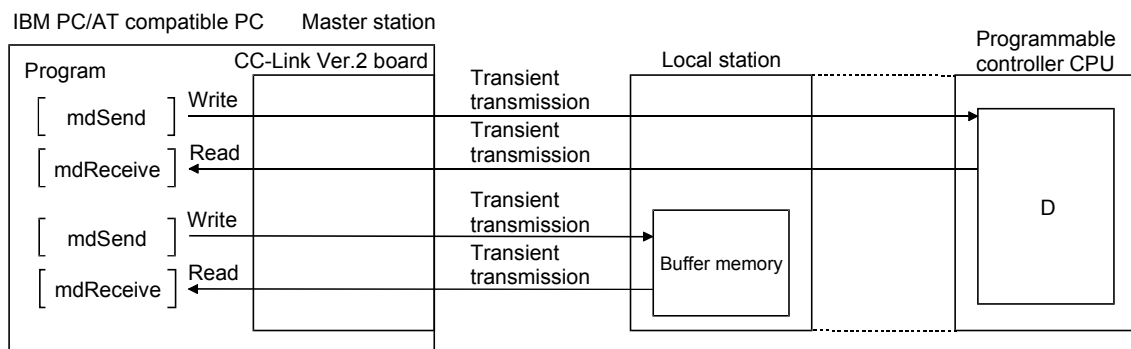
(4) Intelligent device station communication

The communication between the master station and the intelligent device station uses two types of transmission methods: cyclic transmission and transient transmission.

(a) Cyclic transmission

Handshaking signals with the intelligent device station (positioning start, positioning end, etc.) are communicated using the remote input RX and remote output RY. Numeric data (positioning start number, present feed value, etc.) is communicated using the remote registers RWw and RWr.
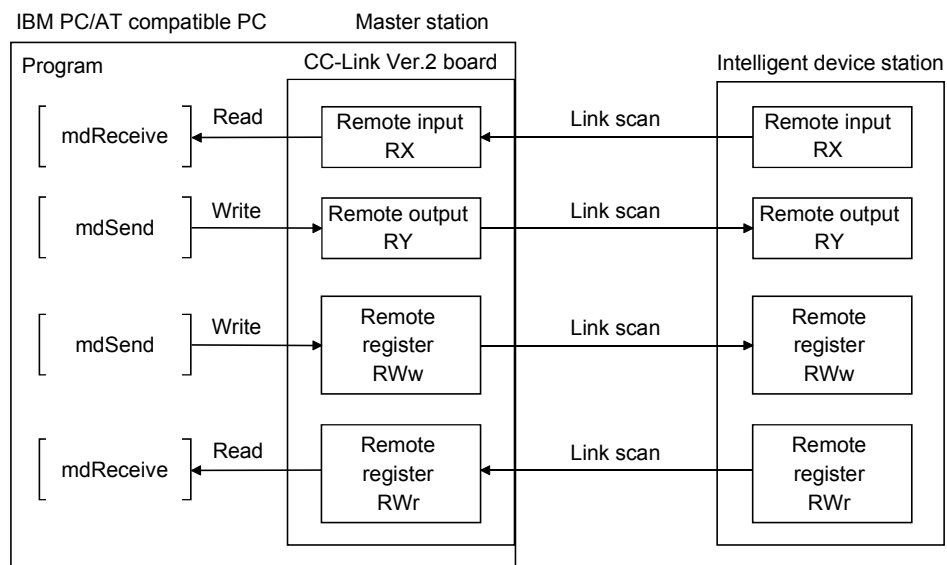
(b) Transient transmission

Read and write operations can be performed for the intelligent device station buffer memory at an arbitrary timing (using the mdReceive and mdSend functions, respectively).
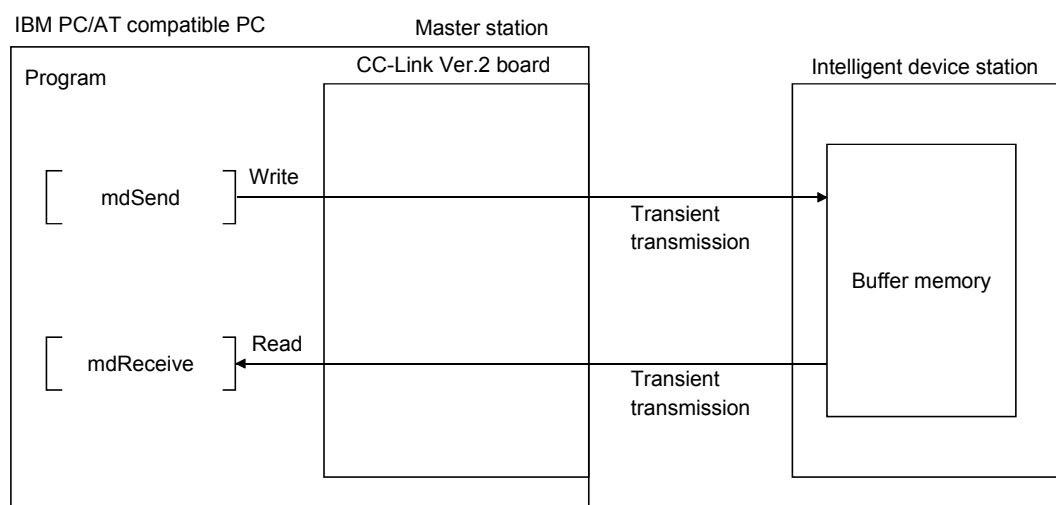
(5) System down prevention (Slave station disconnect function)

Even if a module system fails because of power failure or power off, it will not affect the communication with other normal modules since the system employs the bus connection method.

Also, for a module using a 2-piece terminal block, the module can be replaced during data link. (Replace the module after turning its power off. Also check that the switch setting on the replaced module is same as the one set on the module before replacement.) However, if the cable is disconnected, the data link to all stations is disabled.
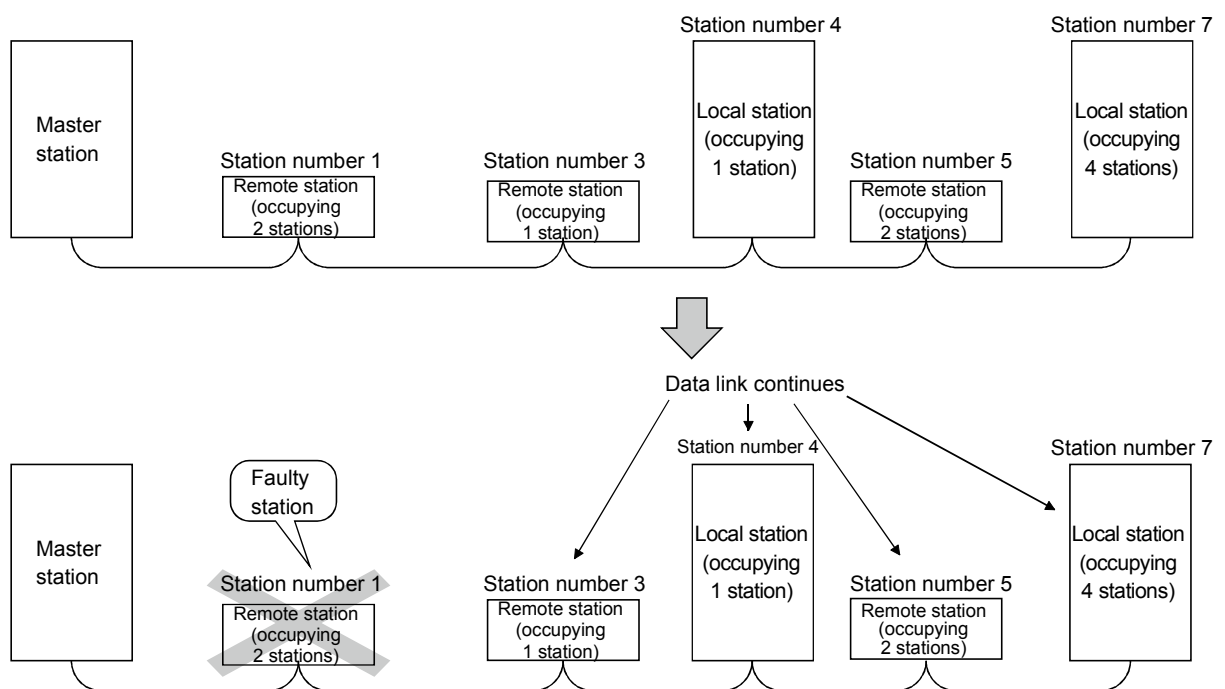
(6) Auto return function

When a module that has been disconnected from the link due to power off recovers and returns to the normal status, it will join the data link automatically.

(7) Input data status setting from a data-link faulty station

The data entered (received) from a data-link faulty station can be cleared, or the status immediately before the error can be restored.

(8) Standby master function

This function enables the data link to continue working by switching to a standby master station (backup station for the master station) if a malfunction occurs in the master station.

> **POINT**
>
> The personal computer can be set as a standby master station only when the master station is also a personal computer. If the master station is a programmable controller CPU, the personal computer cannot be set as a standby master station.

Data link control
by the master station
Master station

Data link control
in progress

Remote I/O station
Station number 2
Number of occupied stations: 1

Remote I/O station
Station number 3
Number of occupied stations: 1

Standby master station
Station number 1
Number of occupied stations: 1

Standby

Cyclic communication   Cyclic communication   Cyclic communication

Master station is down→Data link control by the standby master station
Master station

Remote I/O station
Station number 2
Number of occupied stations: 1

Remote I/O station
Station number 3
Number of occupied stations: 1

Standby master station
Station number 1
Number of occupied stations: 1

Data link control
in progress

Cyclic communication   Cyclic communication   Cyclic communication

(9) Mode selection according to the system

The CC-Link system has 3 types of modes applicable to various systems. Select one of the modes in the parameter setting of the CC-Link Ver.2 utility.
Refer to Appendix 5 for the mode selection.
Each of the modes is described below.

Mode	Description	Connectable station
Remote net Ver.1 mode	The compatibility mode with the CC-Link Ver.1 board. Select this mode when the cyclic points increasing is not required or when the CC-Link Ver.2 board is used as substitute for the CC-Link Ver.1 board.	Remote I/O station Remote device station Intelligent device station Local station Standby master station
Remote net Ver.2 mode	Select this mode when configuring a new system with the cyclic points increasing.	
Remote net additional mode	Select this mode when adding a Ver.2 compatible slave station to the existing system to increase the number of cyclic points.	

(10) Reserve station function

Stations that are not actually connected (stations to be connected in the future) will not be treated as faulty stations if they are specified as reserve stations.

Stations that will be connected in the future

(Reserve station)
Station number 4

| Master station | Station number 1 Remote station (occupying 2 stations) | Station number 3 Remote station (occupying 1 station) | Local station (occupying 4 stations) | Station number 8 Remote station (occupying 2 stations) | (Reserve station) Station number 10 Remote station (occupying 1 station) |

(11) Error invalid station setting function

By setting network parameters, a module that is powered off in the system configuration will not be treated as a "data link faulty station" by the master station and local station. However, exercise caution since errors are no longer detected.

Stations to be set as error invalid stations

| Master station | Station number 1 Remote station (occupying 2 stations) | Station number 3 Remote station (occupying 1 station) | Station number 4 Local station (occupying 1 station) | Station number 5 Remote station (occupying 2 stations) | Station number 7 Local station (occupying 4 stations) |

This station does not become a data link faulty station.

| Master station | Station number 1 Remote station (occupying 2 stations) | Station number 3 Remote station (occupying 1 station) | Station number 4 Local station (occupying 1 station) | Station number 5 Remote station (occupying 2 stations) | Station number 7 Local station (occupying 4 stations) |

(12) Data link stop/restart function

The data link can be stopped and restarted while it is being used.

(13) Duplicate station number check function

This is a transmission method by which data communications are available between 1:1stations at any given timing by specifying a target station.

(14) Transient transmission

In this method of transmission, a counterpart is specified and 1:1 communication is performed at an arbitrary timing.
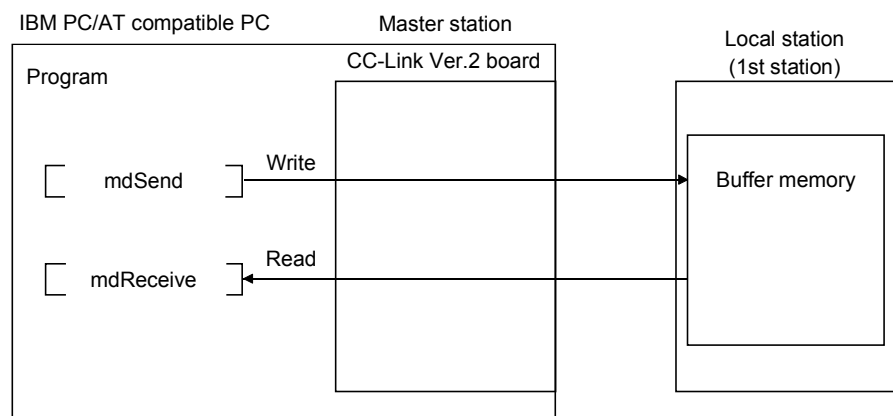
(15) Backward compatibility

By setting the Remote net ver.1 mode, the user program of the CC-Link Ver.1 board can be used on the CC-Link Ver.2 board.
Select the remote net ver.1 mode when the cyclic points increasing is not required or when the CC-Link Ver.2 board is used as substitute for the CC-Link Ver.1 board.

(16) Cyclic points increase function

When the Remote net ver.2 mode or Remote net additional mode is selected, the number of cyclic points can be increased up to 8192 points for RX/RY and up to 2048 words for RWr/RWw per network by the expanded cyclic setting (single, double, quadruple or octuple).
Also, it can be increased up to 224 points for RX/RY and up to 32 words for RWr/RWw per station. (Refer to Section 4.4.7)

(17) Remote I/O station points setting

I/O points are set for remote I/O stations.
Since only the points used in remote input RX and remote output RY need to be set for remote I/O stations, the reserved points for the remote I/O stations can be reduced. This enables the minimum remote device allocation in the CC-Link system. (Refer to Section 4.4.6)

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2 SYSTEM CONFIGURATION

This chapter explains the system configuration of the CC-Link.

2.1 Overall Configuration

A total of 64 remote I/O stations, remote device stations, local stations, standby master stations, and intelligent device stations can be connected to a single master station. However, the following conditions must be satisfied:

(1) Remote net ver.1 mode

Condition 1	$\{(1 \times a) + (2 \times b) + (3 \times c) + (4 \times d)\} \leqq 64$	a: Number of modules occupying 1 station b: Number of modules occupying 2 stations c: Number of modules occupying 3 stations d: Number of modules occupying 4 stations
Condition 2	$\{(16 \times A) + (54 \times B) + (88 \times C)\} \leqq 2304$	A: Number of remote I/O stations $\leqq$ 64 B: Number of remote device stations $\leqq$ 42 C: Number of local stations, standby master stations and intelligent device stations $\leqq$ 26

2

(2) Remote net ver.2 mode, remote net additional mode

Condition 1	$\{(a + a2 + a4 + a8)$ $+ (b + b2 + b4 + b8) \times 2$ $+ (c + c2 + c4 + c8) \times 3$ $+ (d + d2 + d4 + d8) \times 4\} \leqq 64$	a: The total number of ver.1 compatible slave stations that occupy 1 station, and ver.2 compatible slave stations that occupy 1 station which are set to "Single".
Condition 2	$[\{(a \times 32) + (a2 \times 32) + (a4 \times 64) + (a8 \times 128)\}$ $+ \{(b \times 64) + (b2 \times 96) + (b4 \times 192) + (b8 \times 384)\}$ $+ \{(c \times 96) + (c2 \times 160) + (c4 \times 320) + (c8 \times 640)\}$ $+ \{(d \times 128) + (d2 \times 224) + (d4 \times 448) + (d8 \times 896)\}] \leqq 8192$	b: The total number of ver.1 compatible slave stations that occupy 2 stations, and ver.2 compatible slave stations that occupy 2 stations which are set to "Single".
Condition 3	$[\{(a \times 4) + (a2 \times 8) + (a4 \times 16) + (a8 \times 32)\}$ $+ \{(b \times 8) + (b2 \times 16) + (b4 \times+ 32) + (b8 \times 64)\}$ $+ \{(c \times 12) + (c2 \times 24) + (c4 \times 48) + (c8 \times 96)\}$ $+ \{(d \times 16) + (d2 \times 32) + (d4 \times 64) + (d8 \times 128)\}] \leqq 2048$	c: The total number of ver.1 compatible slave stations that occupy 3 stations, and ver.2 compatible slave stations that occupy 3 stations which are set to "Single". d: The total number of ver.1 compatible slave stations that occupy 4 stations, and ver.2 compatible slave stations that occupy 4 stations which are set to "Single". a2: The number of ver.2 compatible stations that occupy 1 station which are set to "Double". b2: The number of ver.2 compatible stations that occupy 2 stations which are set to "Double". c2: The number of ver.2 compatible stations that occupy 3 stations which are set to "Double". d2: The number of ver.2 compatible stations that occupy 4 stations which are set to "Double". a4: The number of ver.2 compatible stations that occupy 1 station which are set to "Quadruple". b4: The number of ver.2 compatible stations that occupy 2 stations which are set to "Quadruple". c4: The number of ver.2 compatible stations that occupy 3 stations which are set to "Quadruple". d4: The number of ver.2 compatible stations that occupy 4 stations which are set to "Quadruple". a8: The number of ver.2 compatible stations that occupy 1 station which are set to "Octuple". b8: The number of ver.2 compatible stations that occupy 2 stations which are set to "Octuple". c8: The number of ver.2 compatible stations that occupy 3 stations which are set to "Octuple". d8: The number of ver.2 compatible stations that occupy 4 stations which are set to "Octuple".
Condition 4	$\{(16 \times A) + (54 \times B) + (88 \times C)\} \leqq 2304$	A: Number of remote I/O stations $\leqq 64$ B: Number of remote device stations $\leqq 42$ C: Number of local stations, standby master stations and intelligent device stations $\leqq 26$

Master station

IBM PC/AT
compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor (required)

Maximum 26

Local station

QJ61BT11(N)

Local station

A1SJ61QBT11
AJ61QBT11

Local station

A1SJ61BT11
AJ61BT11

Local station

IBM PC/AT
compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11
A80BDE-J61BT11
A80BDE-J61BT13

CC-Link dedicated cable

Maximum 26

Intelligent device station

RS-232 interface module
AJ65BT-R2

Terminal resistor (required)

Maximum 42

Remote device station

Analog/digital converter
AJ65BT-64AD

Maximum 64

Remote I/O station

Remote I/O module
AJ65BTB1-16D
AJ65BTC1-32D

CC-Link dedicated cable

Total 64

2.2 Applicable Systems

This section describes applicable personal computers and provides some precautions on the system configuration.

2.2.1 Applicable personal computers and number of boards that can be installed

(1) Applicable personal computers

The following table shows the operating environment for the CC-Link Ver.2 board. For details on the personal computer and operating system, refer to the instructions on the following pages.

Item		Description
Personal computer		Windows® supported personal computer
	CPU	Refer to "(a) Applicable operating system and the corresponding required personal computer performance"
	Required memory	
	PCI bus specifications	For Q80BD-J61BT11N • Compliant with PCI standard Rev.2.2 (5V DC, 32-bit bus, Basic clock : 33MHz)
	PCI Express bus specifications	For Q81BD-J61BT11 • Compliant with PCI Express standard Rev.1.0a (3.3 V DC, Link width : 1lane, Basic clock : 100MHz)
Operating system (English version) [1] [2]		Microsoft® Windows NT® Workstation Operating System Version 4.0, Service Pack3 or higher Microsoft® Windows® 2000 Professional Operating System Microsoft® Windows® XP Professional Operating System Microsoft® Windows® XP Home Edition Operating System Microsoft® Windows Server® 2003 R2 Operating System Microsoft® Windows Vista® Home Basic Operating System Microsoft® Windows Vista® Home Premium Operating System Microsoft® Windows Vista® Business Operating System Microsoft® Windows Vista® Ultimate Operating System Microsoft® Windows Vista® Enterprise Operating System Microsoft® Windows Server® 2008 Operating System Microsoft® Windows® 7 Home Premium Operating System Microsoft® Windows® 7 Professional Operating System Microsoft® Windows® 7 Ultimate Operating System Microsoft® Windows® 7 Enterprise Operating System
Display		Resolution: 800×600 dot or higher (Recommended: 1024×768 dot)
Available hard disk space		80MB or more
Disk drive		CD-ROM disk drive
Programming language (English version) [2]		Microsoft® Visual Basic® 5.0, Microsoft® Visual Basic® 6.0, Microsoft® Visual Basic® .NET 2003, Microsoft® Visual Studio 2005 Visual Basic®, Microsoft® Visual Studio 2008 Visual Basic®, Microsoft® Visual C++® 5.0, Microsoft® Visual C++® 6.0, Microsoft® Visual C++® .NET 2003, Microsoft® Visual Studio 2005 Visual C++®, Microsoft® Visual Studio 2008 Visual C++ ®

∗1: 64-bit version is not supported.

∗2: User programs created in the English environment work only in the English environment.

(a) Applicable operating system and the corresponding required personal computer performance

Operating system	Description	
	CPU	Required memory
Windows NT®	Pentium® 133MHz or higher	32MB or more
Windows® 2000	Pentium® 133MHz or higher	64MB or more
Windows® XP	Pentium® 300MHz or higher	128MB or more
Windows Server® 2003 R2	Pentium® 550MHz or higher	256MB or more
Windows Vista®	800MHz or higher	512MB or more
Windows Server® 2008	800MHz or higher	512MB or more
Windows® 7	1GHz or higher	1GB or more

(b) Instructions for personal computer

1) PCI standard

Using a personal computer not compliant with the PCI or PCI Express standard may result in a problem due to poor electrical contact, erroneous operation, etc.

For details on the number of boards that can be installed, installation slot and occupied slots, refer to Section 3.2.

2) The functions being added

Function	Version
Multiprocessor	1.06G or later

3) The functions cannot be used

The hyper-threading technology is not supported by Windows NT® and Windows® 2000. Disable the hyper-threading technology in the BIOS settings of PC.

(c) Instructions for operating system

1) Supported version

Operating system	SW1DNC-CCBD2-B	
	Q80BD-J61BT11N	Q81BD-J61BT11
Windows NT®	All versions	×
Windows® 2000, Windows® XP	All versions	Version 1.06G or later
Windows Vista®	Version 1.04E or later	Version 1.06G or later
Windows Server® 2003 R2	Version 1.06G or later	
Windows Server® 2008, Windows® 7	Version 1.08J or later	

2) User authority

Log on as a user having administrator authority.
Installation, uninstallation and usage of utilities are available only by the administrator's authority.

3) The functions cannot be used

The following functions of operating system cannot be used. If an attempt is made to use any of the following functions, this product may not operate normally.
· Activating the application with Windows® compatible mode.
· Simplified user switch-over
· Remote desktop
· Large font size (Advanced setting of screen property)
· DPI setting other than the normal size (Advanced setting of screen property)
· 64-bit version
· Standby (Hibernate) mode, sleep mode
· The language switching function set by Regional and Language Options Windows Touch
· Windows XP Mode
· Windows Touch

REMARK

When the standby, hibernate mode is set, the dialog box appears and automatically changes the settings.
When exiting the operating system, always shut down the computer.

(2) Number of boards that can be used in one system

A maximum of 4 boards can be used (Using the CC-Link Ver.2 board and the CC-Link Ver.1 board in the same computer is not allowed).

2.2.2 Notes on the system configuration

(1) Combinations of master and standby master stations

The following table shows the combination availability for the master station and standby master station in the system configuration.

Master station		Standby master station							
		Q80BD-J61BT11N Q81BD-J61BT11			A80BD-J61BT11 A80BD-J61BT13	QJ61BT11N			QJ61BT11 AJ61BT11 A1SJ61BT11 AJ61QBT11 A1SJ61QBT11
		Ver.2 Mode	Additional mode	Ver.1 Mode	Ver.1 mode	Ver.2 Mode	Additional mode	Ver.1 Mode	Ver.1 Mode
Q80BD-J61BT11N Q81BD-J61BT11	Ver.2 Mode	○	×	×	×	×	×	×	×
	Additional mode	×	○	×	×	×	×	×	×
	Ver.1 Mode	×	×	○	○	×	×	×	×
A80BD-J61BT11	Ver.1 Mode	×	×	○	○	×	×	×	×
QJ61BT11N	Ver.2 Mode	×	×	×	×	○	×	×	×
	Additional mode	×	×	×	×	×	○	×	×
	Ver.1 Mode	×	×	×	×	×	×	○	○
QJ61BT11	Ver.1 Mode	×	×	×	×	×	×	○	○

○ : Available, × : Not available

(2) Incorporating the CC-Link Ver.1 board into the CC-Link Ver.2 network system

Use any of the following software versions to utilize the CC-Link Ver.1 board at a local station when the master station is in the remote net ver.2 mode or remote net additional mode.

- A80BDE-J61BT11: Version "R" or later
- A80BDE-J61BT13: Version "Y" or later

Refer to "Section 9.1.7" for how to check the software version.

(3) System design to prevent erroneous inputs from the remote I/O modules

(a) When powering on and off

Start the data link after turning on the power to the remote I/O modules.
Turn off the power to the remote I/O modules after stopping the data link.
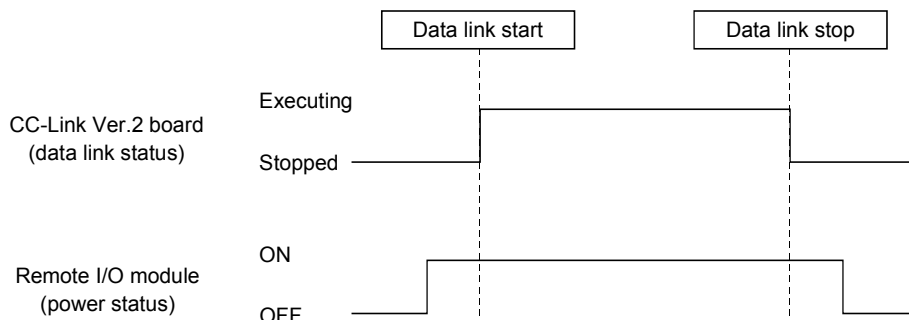
(b) During momentary power failure of the remote I/O modules
When a momentary power failure occurs in the power being supplied to the remote I/O modules (24 V DC), an erroneous input may occur.

[Cause for erroneous inputs due to a momentary power failure]
The remote I/O module hardware uses the power by internally converting the module power (24 V DC) to 5 V DC.
When a momentary power failure occurs in a remote I/O module, the following situation occurs:
(Time for the 5 V DC power in the remote I/O module to turn off)
> (Response time for input module on → off)
Thus, an erroneous input occurs when a refresh is performed within the time indicated by 1) in the figure below.

Remote I/O module
(module power supply and input external supply power)

Remote I/O module
(internal 5 V DC)

Input (Xn)

When the input external power supply turns off, the input (Xn) turns off after the response time for the input module changes from on to off.
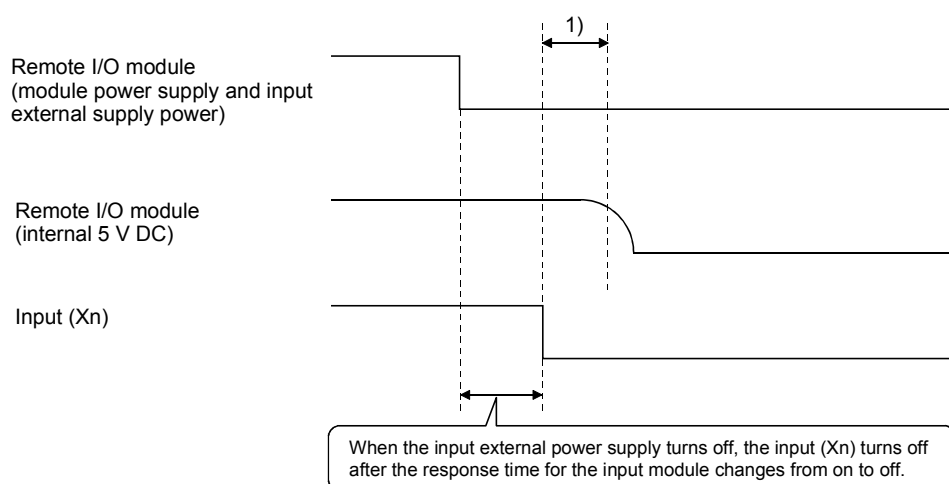
REMARK

When supplying power from a single power source to multiple remote I/O modules, select the proper type of cable and perform wiring by considering the voltage drop. Connections can be established if the receiving port voltage at the remote I/O module is within the specified range of the remote I/O module to be used.

Stabilized power supply

Remote module

Remote module
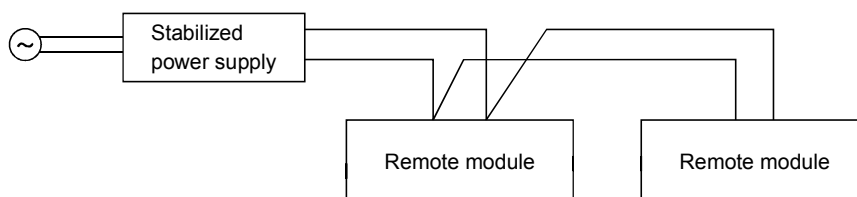
(4) Access to slave station No.64
When the CC-Link Ver.2 board is used, transient transmission to slave station No.64 is not allowed.

REMARK

(1) Access to slave station No.64 is not possible even from GX Developer or GOT on any other station.
(2) Cyclic transmission can be normally performed with slave station No.64.

2.2.3 Equipment list

Table 2.1 lists the equipment that configures the CC-Link system.

Table 2.1 Equipment list

Product name	Model name	Description	Occupied station count	Station type
Master/local board for personal computer	Q80BD-J61BT11N	CC-Link master/local interface board for personal computer (for PCI bus slot)	For a local station, 1 to 4 stations	Master station or local station
	A80BDE-J61BT11		For a local station, 1 or 4 stations	
	Q81BD-J61BT11	CC-Link master/local interface board for personal computer (for PCI Express bus slot)	For a local station, 1 to 4 stations	
Local board for personal computer	A80BDE-J61BT13	CC-Link interface board for personal computer (for PCI bus slot)	For a local station, 1 or 4 stations	Local station
Master/local module	A1SJ61BT11	Master/local module for Q series	For a local station, 1 to 4 stations [1]	Master station or local station
	AJ61BT11	Master/local module for AnS series		
	A1SJ61QBT11	Master/local module for A series		
	AJ61QBT11	Master/local module for Q2AS series		
	QJ61BT11(N)	Master/local module for QnA series		

[1]: For the versions other than below, only one station or four stations can be set.

   QJ61BT11 …..…….. Functional version B or later
   A1SJ61BT11 ……..… Hardware version G or later
   AJ61BT11 …….……. Hardware version F or later
   A1SJ61QBT11 ……. Hardware version G or later
   AJ61QBT11 ….…….. Hardware version F or later

Refer to the CC-Link Partner Association homepage http://www.cc-link.org/ for the partner manufacturer product.

2.2.4 CC-Link version

There are two types of CC-Link version, i.e., Ver.1 and Ver.2.

(1) Definition of Ver.1.00 and Ver.1.10

A product with a cable length of 20cm or longer between stations, which has been achieved by improving the restriction on the conventional cable distance between the stations, is defined as Ver. 1.10.

Whereas, the conventional product is defined as Ver.1.00.

For the maximum total cable length for the Ver. 1.10 products, refer to Section 3.2.2.

The conditions requiring the cable length to be 20cm or longer between stations are as follows:

1) All the stations comprising a CC-Link system must be of Ver.1.10.
2) All the data link cables must be Ver. 1.10 compatible CC-Link dedicated cables.

POINT
If stations of Ver.1.00 and Ver.1.10 are mixed in a system, the maximum total cable length and the cable length between stations will be as specified by Ver.1.00. For the maximum total cable length and the cable length between stations for the Ver.1.00 products, refer to Section 3.2.1.

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(2) Definition of Ver.2

The CC-Link Ver.2 board is defined as the Q80BD-J61BT11N /Q81BD-J61BT11 type CC-Link system master/local interface board supporting the extended cyclic points.

(3) How to check the version

The following logo is not shown on the Ver.1.00 compatible CC-Link board.
On the side of the Ver.1.10 compatible CC-Link board, the "CC-Link" logo is marked.
The Ver.2 compatible CC-Link board has "CC-Link V2" logos in the positions shown below.
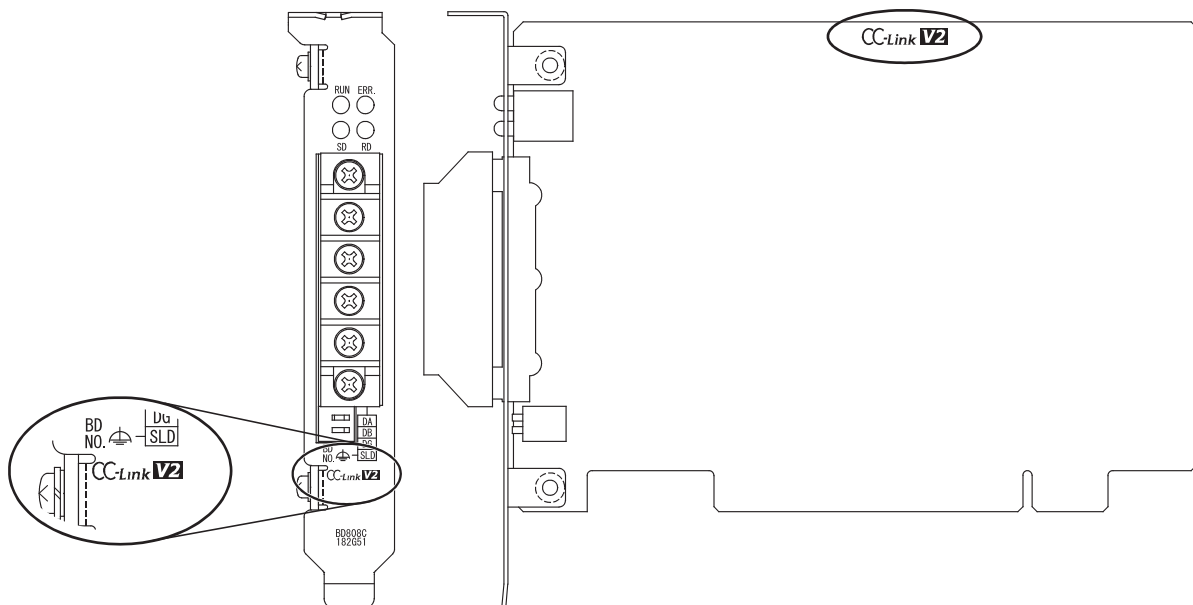
3 SPECIFICATIONS

This chapter explains the specifications of the CC-Link Ver.2 board.

3.1 General Specifications

(1) The following table shows the general specifications of the CC-Link Ver.2 board.

Item			Specifications			
			Q80BD-J61BT11N		Q81BD-J61BT11	
Operating ambient temperature			0 to 55 ℃			
Storage ambient temperature			-25 to 75 ℃			
Operating ambient humidity			5 to 95 % RH, No condensation			
Storage ambient humidity			5 to 95 % RH, No condensation			
Vibration resistance Conforming to JIS B 3502, IEC 61131-2	When there is intermittent vibration	Frequency	10 to 57 Hz	57 to 150 Hz	5 to 9 Hz	9 to 150 Hz
		Acceleration	—	9.8 m/s^2	—	9.8 m/s^2
		Amplitude	0.075 mm	—	3.5 mm	—
		Sweep Count	10 times each in X, Y and Z axis			
	When there is continuous vibration	Frequency	10 to 57 Hz	57 to 150 Hz	5 to 9 Hz	9 to 150 Hz
		Acceleration	—	4.9 m/s^2	—	4.9 m/s^2
		Amplitude	0.035 mm	—	1.75 mm	—
		Sweep Count	10 times each in X, Y and Z axis			
Shock resistance			Conforming to JIS B3502, IEC 61131-2 (147 m/s^2, 3 times each in 3 directions XYZ)			
Operating environment			No corrosive gas present			
Operating height *1			2000 m (6562 ft) or less			
Installation area			On the control board			
Over-voltage category *2			II or less			
Pollution rate *3			2 or less			

*1: The board cannot be used under the environment where the atmospheric pressure is higher than the one at the altitude of 0 m.

*2: Indicates the distribution area where the device is assumed to be connected, from the public power distribution network to the local machine device.
Category II is applied to the devices to which the power is supplied from a fixed equipment.
The surge resistance voltage of a rated 300 V device is 2500 V.

*3: This is an index which indicates the occurrence rate of the conductive object in the environment where the device is used.
Pollution rate II indicates that only non-conductive pollution may occur with a possibility of generating temporary conductivity due to accidental condensation.

(2) General specifications of the CC-Link Ver.2 board or the personal computer, whichever is lower, must be satisfied after installation.

3.2 Performance Specifications

Table 3.1 shows the performance specifications of the CC-Link Ver.2.

Table 3.1 Performance specifications

Item	Specification	
	Q80BD-J61BT11N	Q81BD-J61BT11
Transmission rate	Can select from 156 kbps / 625 kbps / 2.5 Mbps / 5 Mbps / 10 Mbps	
Overall cable distance (maximum transmission distance)	Varies according to the transmission rate (Refer to Section 3.2.1, 3.2.2)	
Maximum number of connected stations (master station)	64 (Refer to Section 2.1 for the conditions for the number of connected stations)	
Occupied station count (when mounted to local station)	In remote net ver.1 mode: 　　　　　　1 or 4 station(s) (Can be changed by the utility parameter setting.) In remote net ver.2 mode, remote net additional mode: 　　　　　　1 to 4 station(s) (Can be changed by the utility parameter setting.)	
Maximum number of link points per system [1]	Remote I/O (RX, RY):　2048 points Remote register (RWw): 256 points (master station → remote station/local station/intelligent device station/standby master station) Remote register (RWr):　256 points (remote station/local station/ intelligent device station/standby master station → master station)	
Remote station/local station/intelligent device station/standby master station Number of link points per link [1]	Remote I/O (RX, RY):　　32 points (local station is 30 points) Remote register (RWw): 4 points (master station → remote station/local station/intelligent device station/standby master station) Remote register (RWr):　4 points (remote station/local station/intelligent device station/standby master station → master station)	
Communication method	Broadcast polling method	
Synchronous method	Frame synchronous method	
Encoding method	NRZI method	
Transmission path	Bus format (conforms to EIA RS-485)	
Transmission format	Conforms to HDLC	
Error control system	CRC ($X^{16} + X^{12} + X^5 + 1$)	
Connection cable	CC-Link dedicated cable/ CC-Link dedicated high performance cable/ Ver.1.10-compatible CC-Link dedicated cable [2]	
RAS function	• Auto return function • Slave station disconnect function • Error detection by the link special relay/register	
Number of boards that may be used in one system	Maximum 4 [3]	
Loading slot	PC PCI bus slot (half size)	PC PCI Express X1, X2, X4, X8, X16 slot (half size)
Bus performance	PCI bus Bus width: 32 bits Bus clock frequency: 0 to 33MHz 5V DC ±5% PCI standard Rev.2.2	PCI Express Link width: 1 lane Transmission speed: 2.5Gb/s 3.3V DC ±9% PCI Express standard Rev.1.0a
Occupied slot	1 slot	
5 V DC internal current consumption	0.56A	—
3.3 V DC Internal current consumption	—	1.06A
Weight	0.11kg	0.11kg

∗1: The link points shown above apply to the use in the remote net ver.1 mode.
   Refer to Table 3.2 for those in the remote net ver.2 mode, remote additional mode.
∗2: Ver.1.10-compatible CC-Link dedicated cables, CC-Link dedicated cables (Ver.1.00) and CC-Link dedicated high-
   performance cables cannot be used together. If used together, correct data transmission will not be guaranteed.
   Also attach the terminating resister which matches the kind of the cable. (Refer to section 8.6)
∗3: Using the CC-Link Ver.2 board and the CC-Link Ver.1 board in the same computer is not allowed.

Table 3.2 Number of link points for remote net ver.2 mode/remote net additional mode

Item			Specifications			
Maximum No. of link points per system			Remote I/O (RX, RY) : 8192 points Remote register (RWw) : 2048 points (master station → remote device station/local station/intelligent device station/standby master station) Remote register (RWr) : 2048 points (remote device station/local station/intelligent device station/standby master station → master station)			
No. of link points per station	Expanded cyclic setting		Single	Double	Quadruple	Octuple
	Remote I/O (RX, RY)		32 points (30 points for local station)	32 points (30 points for local station)	64 points (62 points for local station)	128 points (126 points for local station)
	Remote register (RWw)		4 points	8 points	16 points	32 points
	Remote register (RWr)		4 points	8 points	16 points	32 points
Number of link points per occupied station count	Occupies 1 station	Remote I/O (RX, RY)	32 points	32 points	64 points	128 points
		Remote register (RWw)	4 points	8 points	16 points	32 points
		Remote register (RWr)	4 points	8 points	16 points	32 points
	Occupies 2 stations	Remote I/O (RX, RY)	64 points	96 points	192 points	384 points
		Remote register (RWw)	8 points	16 points	32 points	64 points
		Remote register (RWr)	8 points	16 points	32 points	64 points
	Occupies 3 stations	Remote I/O (RX, RY)	96 points	160 points	320 points	640 points
		Remote register (RWw)	12 points	24 points	48 points	96 points
		Remote register (RWr)	12 points	24 points	48 points	96 points
	Occupies 4 stations	Remote I/O (RX, RY)	128 points	224 points	448 points	896 points
		Remote register (RWw)	16 points	32 points	64 points	128 points
		Remote register (RWr)	16 points	32 points	64 points	128 points

3.2.1 Maximum overall cable distance (for Ver.1.00)

The relationship between the transmission speed and the maximum overall cable distance is described below:

(1) For a system consisting of only remote I/O stations and remote device stations

＊1: Cable length between remote I/O stations or remote device stations.
＊2: Cable length between the master station and the adjacent stations.

CC-Link dedicated cable (uses terminal resistor 110 Ω)

Transmission rate	Station-to-station cable length		Maximum overall cable distance
	＊1	＊2	
156 kbps	30 cm (11.81 in.) or more	1 m (3.28 ft.) or more	1200 m (3937.2 ft.)
625 kbps			600 m (1968.6 ft.)
2.5 Mbps			200 m (656.2 ft.)
5 Mbps	30 cm (11.81 in.) to 59 cm (23.23 in.)＊3		110 m (360.9 ft.)
	60 cm (23.62 in.) or more		150 m (492.15 ft.)
10 Mbps	30 cm (11.81 in.) to 59 cm (23.23 in.)＊3		50 m (164.1 ft.)
	60 cm (23.62 in.) to 99 cm (38.98 in.)＊3		80 m (262.5 ft.)
	1 m (3.28 ft.) or more		100 m (328.1 ft.)

CC-Link dedicated high performance cable (uses terminal resistor 130 Ω)

Transmission rate		Station-to-station cable length		Maximum overall cable distance
		＊1	＊2	
156 kbps		30 cm (11.81 in.) or more	1 m (3.28 ft.) or more	1200 m (3937.2 ft.)
625 kbps				900 m (2952.9 ft.)
2.5 Mbps				400 m (1312.4 ft.)
5 Mbps				160 m (524.96 ft.)
10 Mbps	Number of connected stations: 1 to 32			100 m (328.1 ft.)
	Number of connected stations: 33 to 48	30 cm (11.81 in.) to 39 cm (15.35 in.)＊3		80 m (262.5 ft.)
		40 cm (15.75 in.) or more		100 m (328.1 ft.)
	Number of connected stations: 49 to 64	30 cm (11.81 in.) to 39 cm (15.35 in.)＊3		20 m (65.52 ft.)
		40 cm (15.75 in.) to 69 cm (27.17 in.)＊3		30 m (98.43 ft.)
		70 cm (27.56 in.) or more		100 m (328.1 ft.)

＊3: The cable length between remote I/O stations or remote device stations is within this range and if even one location is wired, the maximum overall cable distance will be as indicated above.

(Example) When the transmission rate is 10 Mbps, and 43 remote I/O stations and remote device stations are connected using the CC-Link dedicated high performance cable, because the cable connecting the second and third stations is "35 cm (13.78 in.)", the maximum overall cable distance will be "80 cm (31.5 in.)".

	First	Second	Third	4th		43th
Master station	Remote I/O station	Remote device station	Remote I/O station	Remote I/O station	- - - - -	Remote device station

1 m (3.28 ft.)   50 cm (19.69 in.)   35 cm (13.78 in.)   50 cm (19.69 in.)
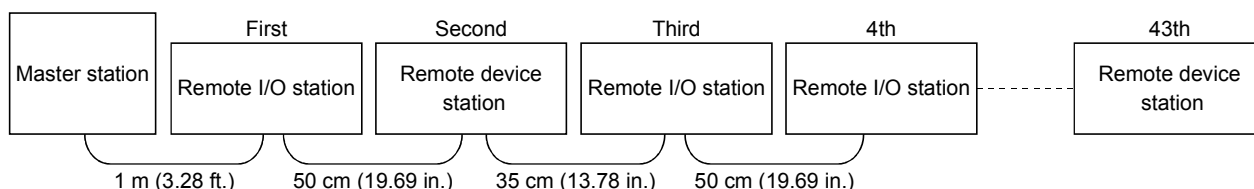
(2) For a system consisting of remote I/O stations, remote device stations, local stations and intelligent device stations

Master station	Remote I/O station or remote device station	Remote I/O station or remote device station	Local station or Intelligent device station	Local station or Intelligent device station

＊2   ＊1   ＊2   ＊2

Maximum overall cable distance
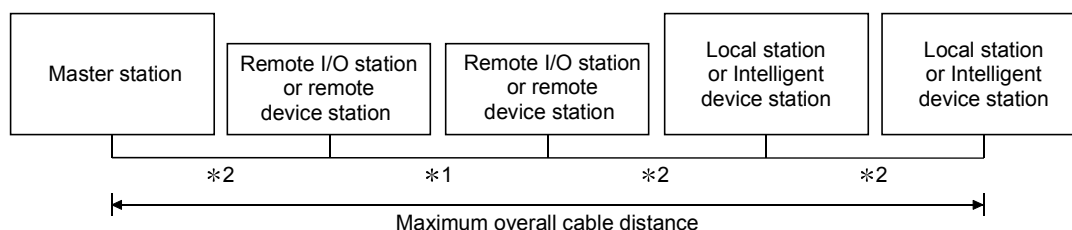
＊1: Cable length between remote I/O stations or remote device stations
＊2: Cable length between the master station or the local or intelligent device station and the adjacent stations

CC-Link dedicated cable (uses terminal resistor 110 Ω)

Transmission rate	Station-to-station cable length		Maximum overall cable distance
	＊1	＊2	
156 kbps	30 cm (11.81 in.) or more	2 m (6.56 ft.) or more	1200 m (3937.2 ft.)
625 kbps			600 m (1968.6 ft.)
2.5 Mbps			200 m (656.2 ft.)
5 Mbps	30 cm (11.81 in.) to 59 cm (23.23 in.) ＊3		110 m (360.9 ft.)
10 Mbps	60 cm (23.62 in.) or more		150 m (492.15 ft.)
	30 cm (11.81 in.) to 59 cm (23.23 in.) ＊3		50 m (164.1 ft.)
	60 cm (23.62 in.) to 99 cm (38.98 in.) ＊3		80 m (262.5 ft.)
	1 m (3.28 ft.) or more		100 m (328.1 ft.)

CC-Link dedicated high performance cable (uses terminal resistor 130 Ω)

Transmission rate	Station-to-station cable length		Maximum overall cable distance
	＊1	＊2	
156 kbps	30 cm (11.81 in.) or more	2 m (6.56 ft.) or more	1200 m (3937.2 ft.)
625 kbps			600 m (1968.6 ft.)
2.5 Mbps			200 m (656.2 ft.)
5 Mbps	30 cm (11.81 in.) to 59 cm (23.23 in.) ＊3		110 m (360.9 ft.)
	60 cm (23.62 in.) or more		150 m (492.15 ft.)
10 Mbps	70 cm (27.56 in.) to 99 cm (38.98 in.) ＊3		50 m (164.1 ft.)
	1 m (3.28 ft.) or more		80 m (262.5 ft.)

＊3: The cable length between remote I/O stations or remote device stations is within this range and if even one location is wired, the maximum overall cable distance will be as indicated above.

3.2.2 Maximum overall cable distance (for Ver.1.10)

The relation of the transmission speed and maximum overall cable distance when configuring the entire system with Version 1.10 modules and cable is shown below.
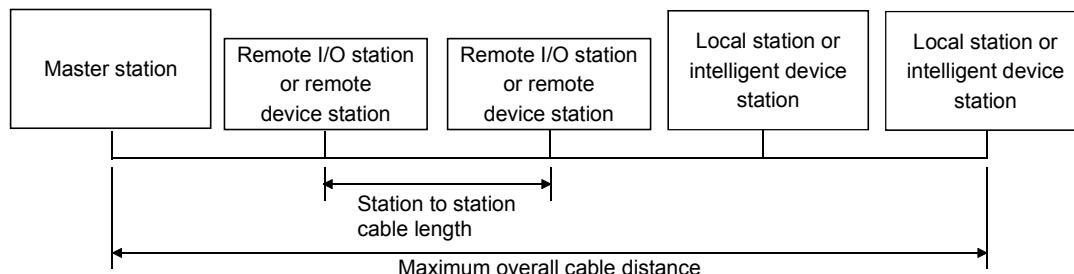
Version 1.10 compatible CC-Link dedicated cable (terminal resistor of 110Ω used)

Transmission speed	Station to station cable length	Maximum overall cable distance
156kbps		1200m (3937.2 ft)
625kbps		900m (2952.9 ft)
2.5Mbps	20 cm (7.88 in) or longer	400m (1312.4 ft)
5Mbps		160m (524.96ft)
10Mbps		100m (328.1 ft)

3.3 CC-Link Dedicated Cable Specifications

Use the CC-Link dedicated cable for the CC-Link system. If a cable other than the CC-Link dedicated cable is used, the performance of the CC-Link system cannot be guaranteed.
If you have any questions regarding the CC-Link dedicated cable, or if you wish to see its specifications, refer to the CC-Link Partner Association homepage http://www.cc-link.org/.

REMARK

For details, refer to the CC-Link cable wiring manual issued by CC-Link Partner Association.

4 FUNCTIONS

This chapter explains the functions of the CC-Link Ver.2 board, dividing them into four sections: "Basic Functions," "Functions for Improving System Reliability," "Useful Functions" and "Transient Transmission Function."

4.1 Function List

(1) Table 4.1 lists the basic functions.

Table 4.1 List of the basic functions

Item	Description	Reference section
Communication with remote I/O station	Performs the communication of on/off information with remote I/O station.	Section 4.2.1
Communication with remote device station	Performs the communication of on/off information and numeric data with remote device station.	Section 4.2.2
Communication with local station	Performs the communication of on/off information and numeric data with local station.	Section 4.2.3
Communication with intelligent device station	Performs communication with intelligent device station via cyclic transmission and transient transmission.	Section 4.2.4

(2) Table 4.2 lists the functions for improving system reliability.

Table 4.2 List of the functions for improving system reliability

Item	Description	Reference section
Slave station disconnect function	Disconnects modules that cannot continue data link because of power off, etc, and continues the data link with only the normal modules.	Section 4.3.1
Auto return function	When a module, which has been disconnected from data link because of power off, etc, returns to the normal status, it automatically joins the data link.	Section 4.3.2
Input data status setting from data link faulty station	Sets the status (clear/latch) of the input (reception) data from a station that became data link faulty because of power off, etc.	Section 4.3.3
Standby master function	Continues data link by switching to the standby master station when a problem occurs in the master station.	Section 4.3.4

(3)   Table 4.3 lists the useful functions.

Table 4.3 List of the useful functions

Item	Description	Reference section
Reserved station function	By assigning modules that will be connected in the future as reserved stations, these will not be treated as data link faulty stations. The reserved stations can also be set as 0 points. If any of the connected modules is designated as a reserved station, it cannot perform data link.	Section 4.4.1
Error invalid station setting function	Prevents modules that will be powered off in the system configuration from being treated as data link faulty stations by setting network parameters.	Section 4.4.2
Data link stop/restart	Stops or restarts the data link that is being executed.	Section 4.4.3
Station number duplicate check function	Checks for duplicate modules having the same station number in the system.	Section 4.4.4
Multiple CPU system support	Allows access to any CPU of a multiple CPU system via a CC-Link Ver.2 board.	Section 4.4.5
Remote I/O station point setting	Allows the I/O points of the remote I/O stations to be selected from among 8 points, 16 points and 32 points, reducing the number of reserved points.	Section 4.4.6
Cyclic points increase	Allows the number of cyclic points per module to be increased from 128 points for RX/RY and 16 points for RWr/RWw in the ver.1 mode to up to 896 points for RX/RY and 128 points for RWr/RWw in the ver.2 mode.	Section 4.4.7

(4)   Table 4.4 lists the transient transmission function.

Table 4.4 List of the transient transmission function

Item	Description	Reference section
Transient transmission	Designates an opposite station and communicates at an arbitrary timing	Section 4.5.1

POINT
Refer to "Section 4.4.7 (3)(b) Whether send/receive is enabled or not" for the availability of cyclic data communication with the CC-Link Ver.2 compatible stations.

4.2 Basic Functions

This section explains the basic functions of the CC-Link Ver.2 board.

4.2.1 Communication with remote I/O stations

The following explains an overview of the communication between the master station and a remote I/O station. In the communication with the remote I/O station, the on/off information of the switches and indicator lamps are communicated via the remote input RX and remote output RY.
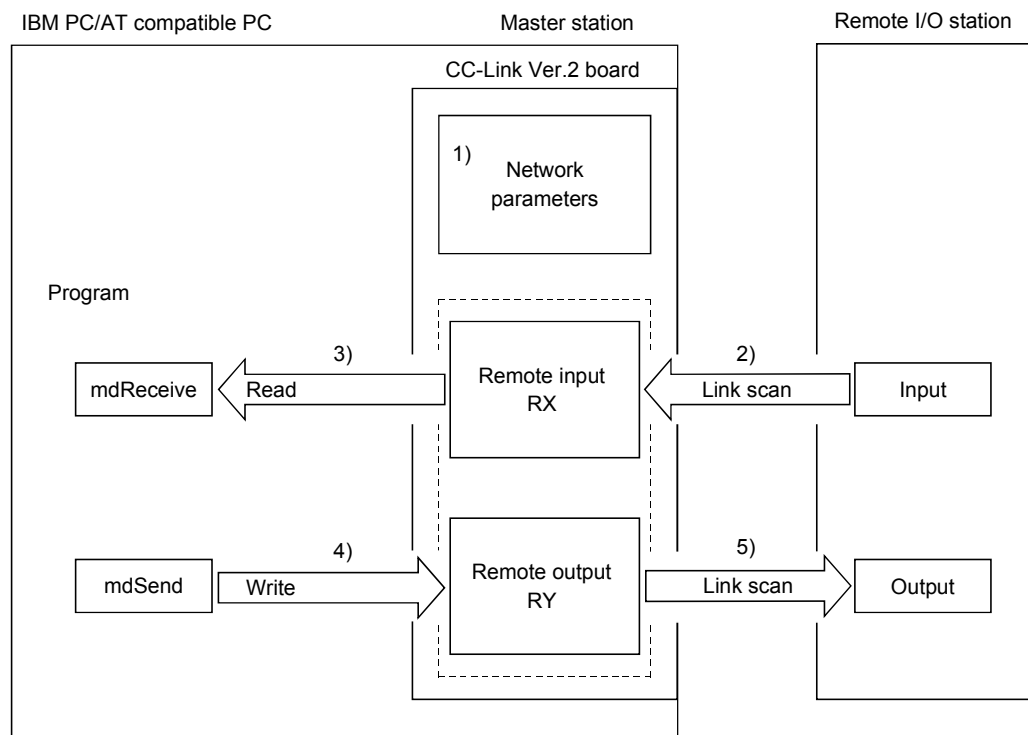
[Data link startup]
1) When the personal computer is powered on, the CC-Link system starts up in accordance with the network parameters set by the CC-Link Ver.2 utility.

[Remote input]

2) The input status of each of the remote I/O stations is automatically stored (for each link scan) in the master station's "remote input RX" buffer memory.

3) The program uses the mdReceive function to read the input status stored in the "remote input RX" buffer memory.
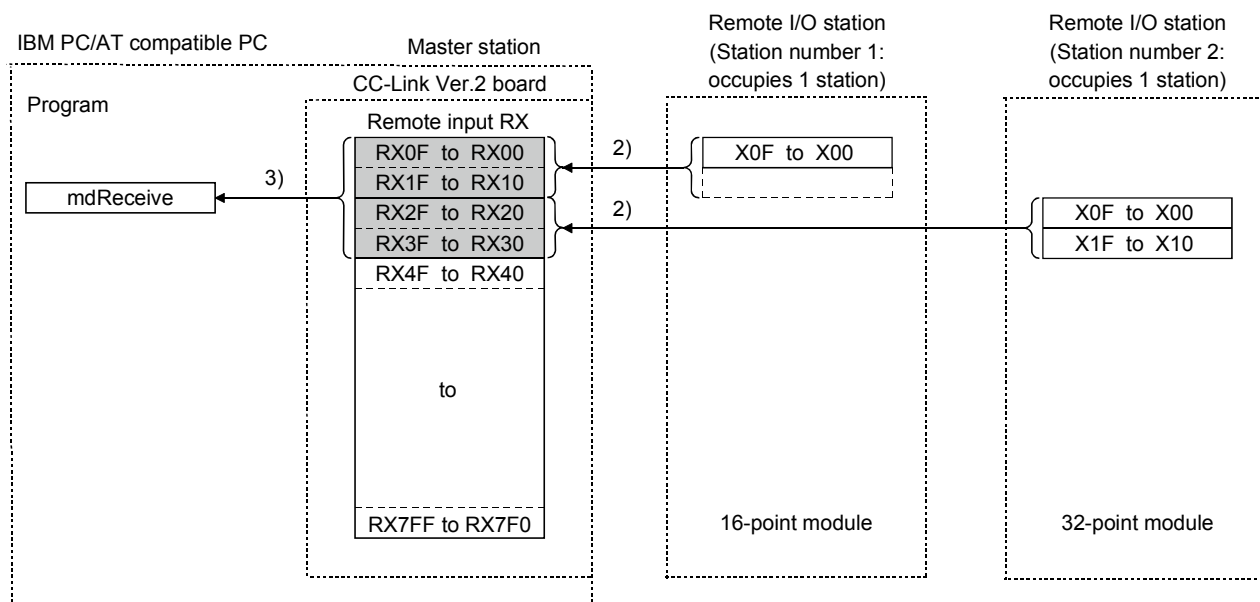
[Remote output]

4) The program uses the mdSend function to write the on/off information to the "remote output RY" buffer memory.

5) The output status stored in the "remote output RY" buffer memory is output automatically (for each link scan) to the remote I/O stations.
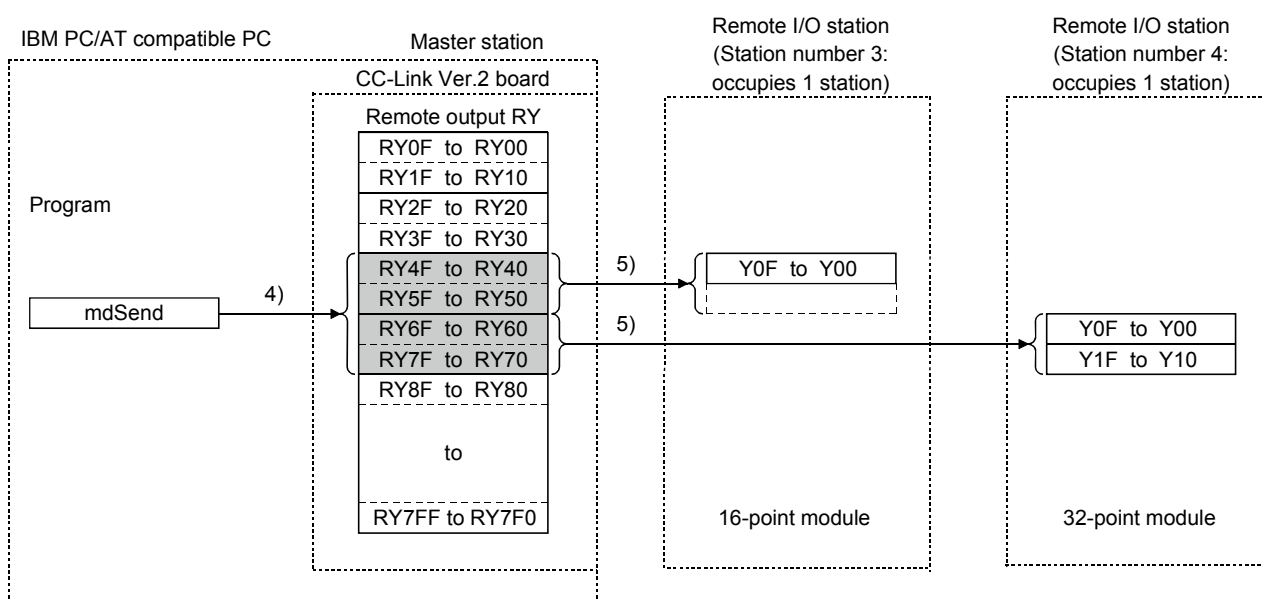
4.2.2 Communication with the remote device stations

This section explains an overview of the communication between the master station and the remote device station.

In the communication with the remote device station, the handshaking signals with the remote device station (initial data processing request flag, error reset request flag, etc.) are communicated using the remote input RX and remote output RY. Numeric data (averaging processing specification, digital output values, etc.) is communicated using the remote register RWw and remote register RWr.
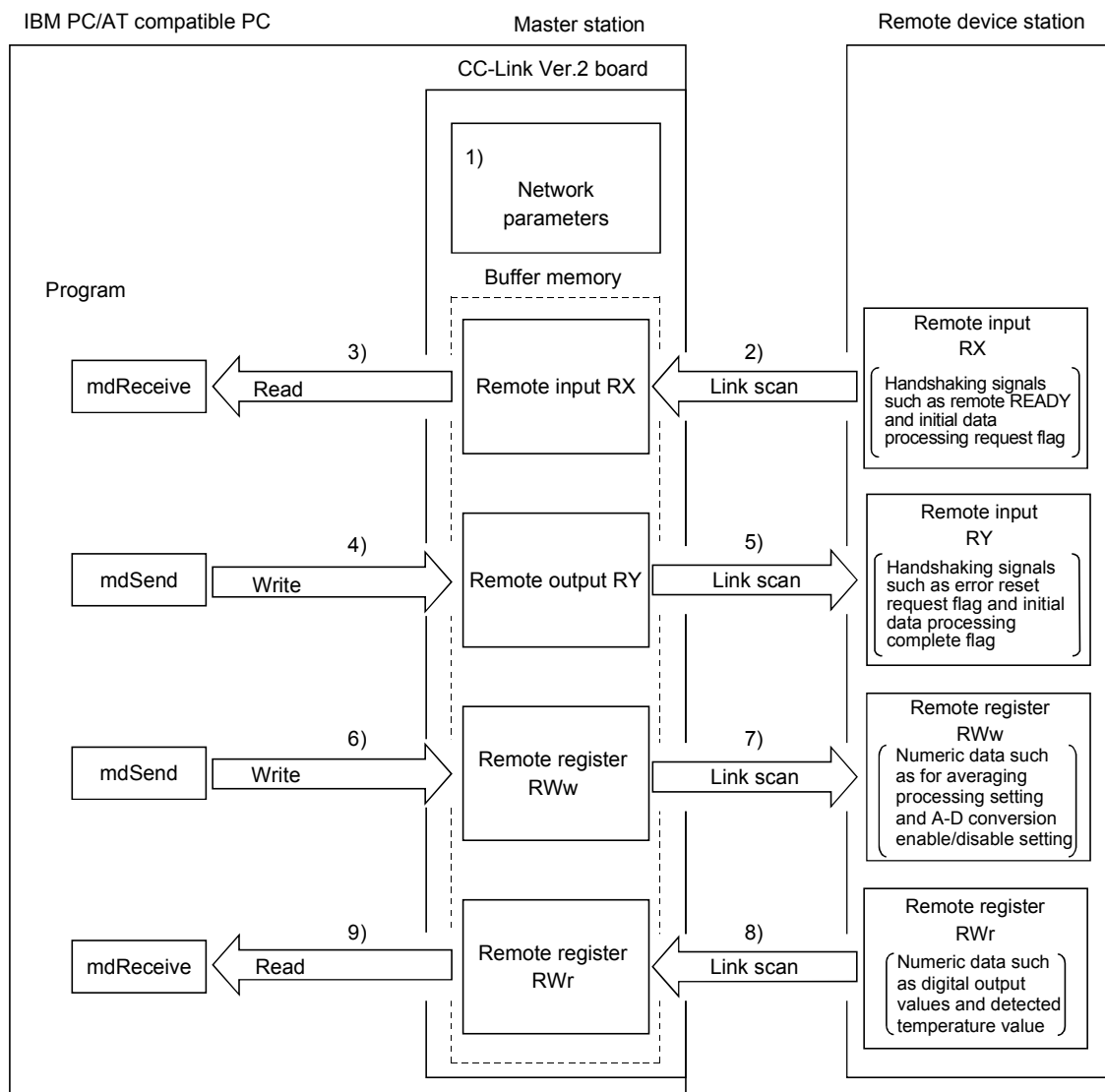
[Data link startup]

1) When the personal computer is powered on, the CC-Link system starts up in accordance with the network parameters set by the CC-Link Ver.2 utility.

[Remote input]

2) The remote input RX of each of the remote device stations is automatically stored (for each link scan) in the master station's "remote input RX" buffer memory.

3) The program uses the mdReceive function to read the input status stored in the "remote input RX" buffer memory.
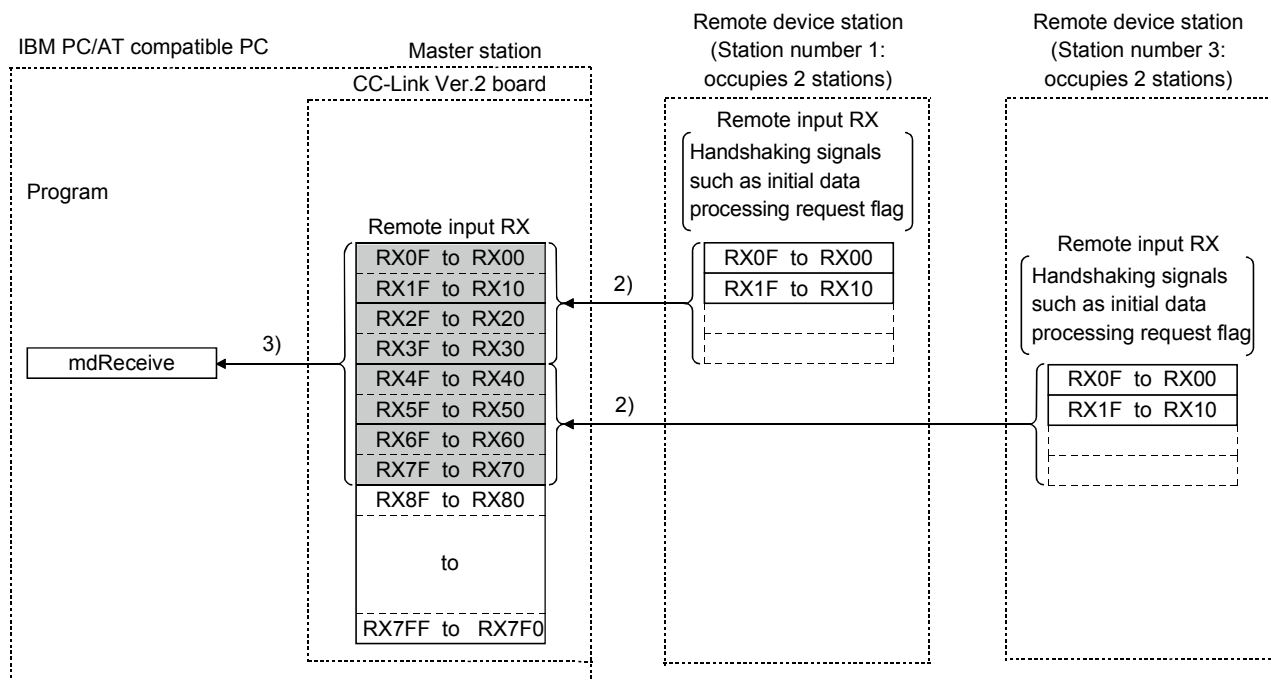
[Remote input RX when the AJ65BT-64DAV is set to station number 1]

Signal direction: AJ65BT-64DAV → Master module	
Device No.	Signal name
RX00 to RX17	Not used
RX18	Initial data processing request flag
RX19	Initial data setting complete flag
RX1A	Error status flag
RX1B	Remote READY
RX1C to RX1F	Not used

[Remote output]

4) The program uses the mdSend function to write the on/off information to the "remote output RX" buffer memory.

5) The remote output RY is automatically set to on/off (for each link scan) according to the output status stored in the "remote output RY" buffer memory.
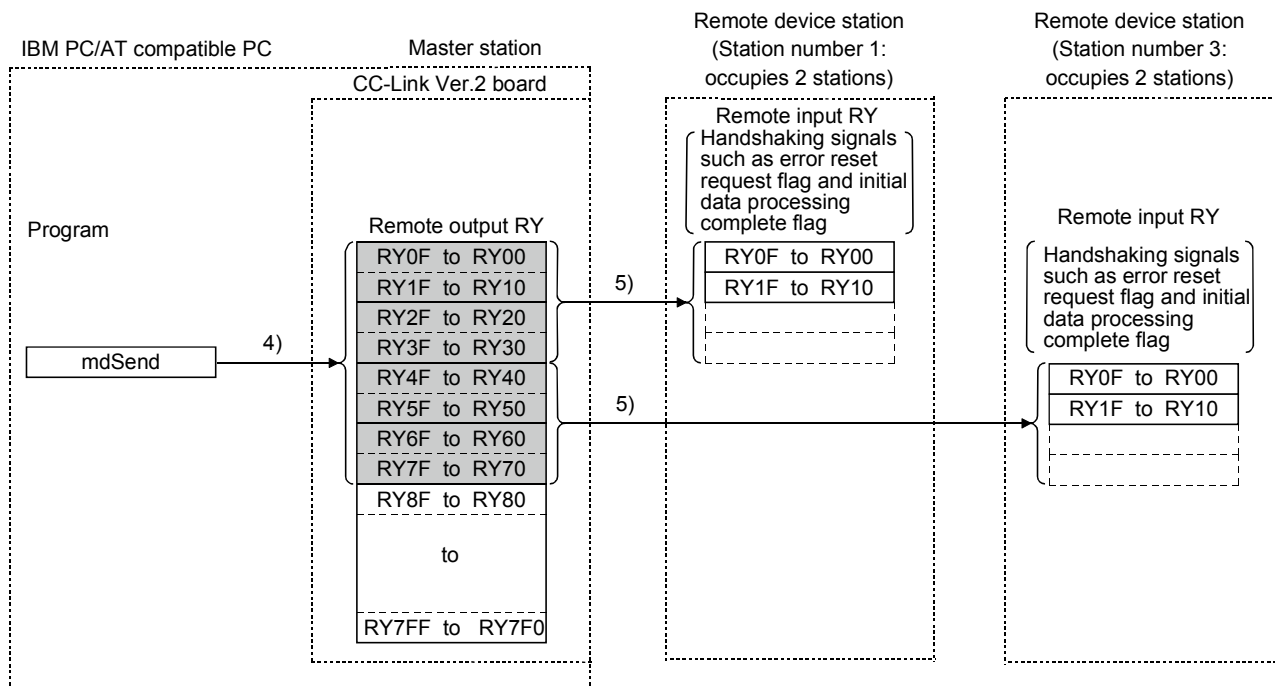
[Remote output RY when the AJ65BT-64DAV is set to station number 1]

Signal direction: Master module → AJ65BT-64DAV	
Device No.	Signal name
RY00	CH1 analog output enable signal
RY01	CH2 analog output enable signal
RY02	CH3 analog output enable signal
RY03	CH4 analog output enable signal
RY04	Selection of offset/gain values
RY05 to RY17	Not used
RY18	Initial data processing complete flag
RY19	Initial data setting request flag
RY1A	Error reset request flag
RY1B to RY1F	Not used

[Writing to the remote register RWw]

6) The program uses the mdSend function to write the transmission data to the "remote register RWw" buffer memory.

7) The data stored in the "remote register RWw" buffer memory is automatically sent to the remote register RWw of each remote device station.
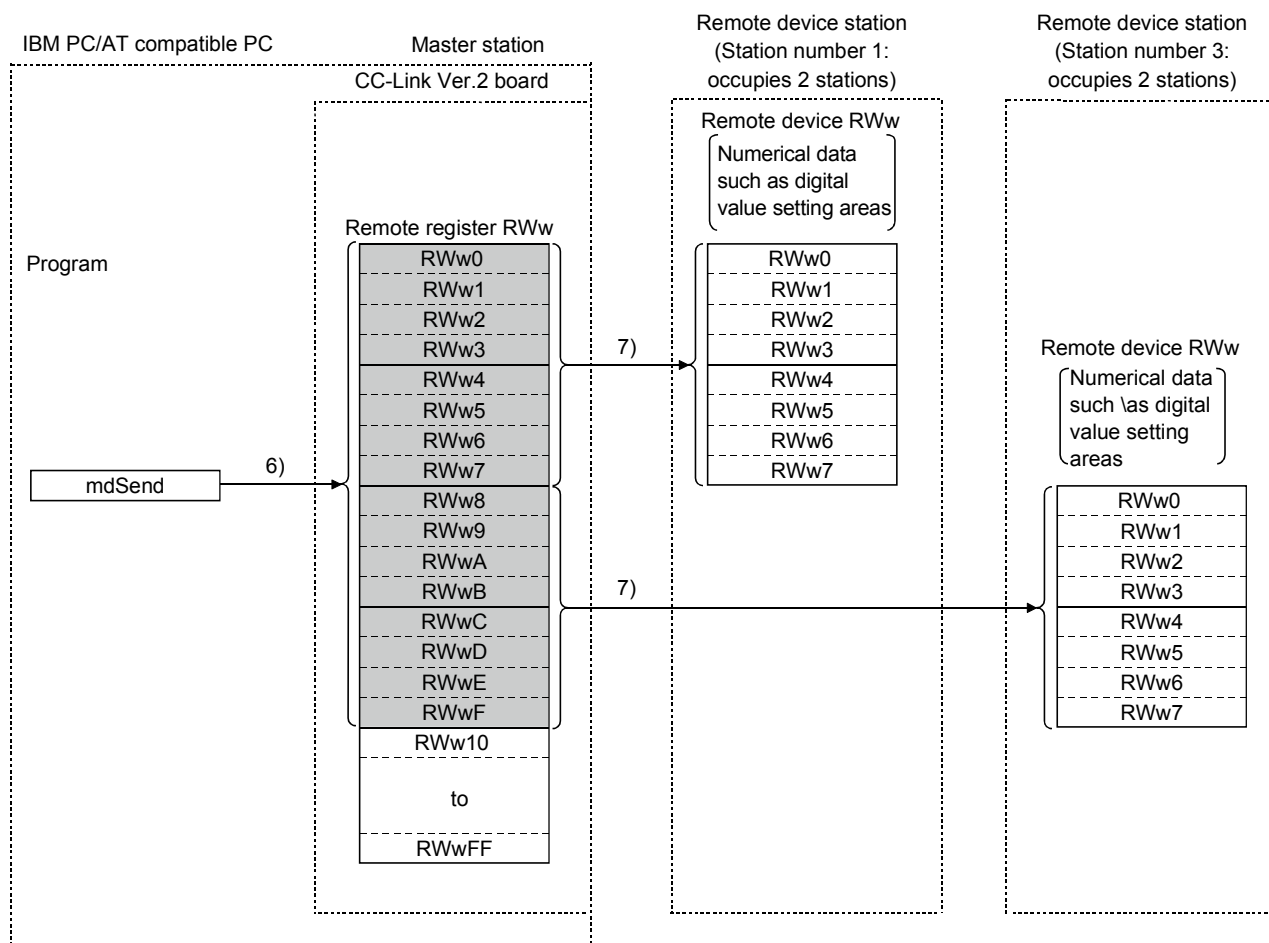
[Remote register RWw when the AJ65BT-64DAV is set to station number 1]

Signal direction: master module → AJ65BT-64	
Address	Description
RWw0	CH1 digital value setting area
RWw1	CH2 digital value setting area
RWw2	CH3 digital value setting area
RWw3	CH4 digital value setting area
RWw4	Analogue output enable/disable setting area
RWw5 to RWw7	Not used

[Reading from the remote register (RWr)]

8) The remote register RWr data of each of the remote device stations is automatically stored in the "remote register Rwr" buffer memory of the master station.

9) The program uses the mdReceive function to read the remote register RWr data of the remote device stations stored in the "remote register RWr" buffer memory.
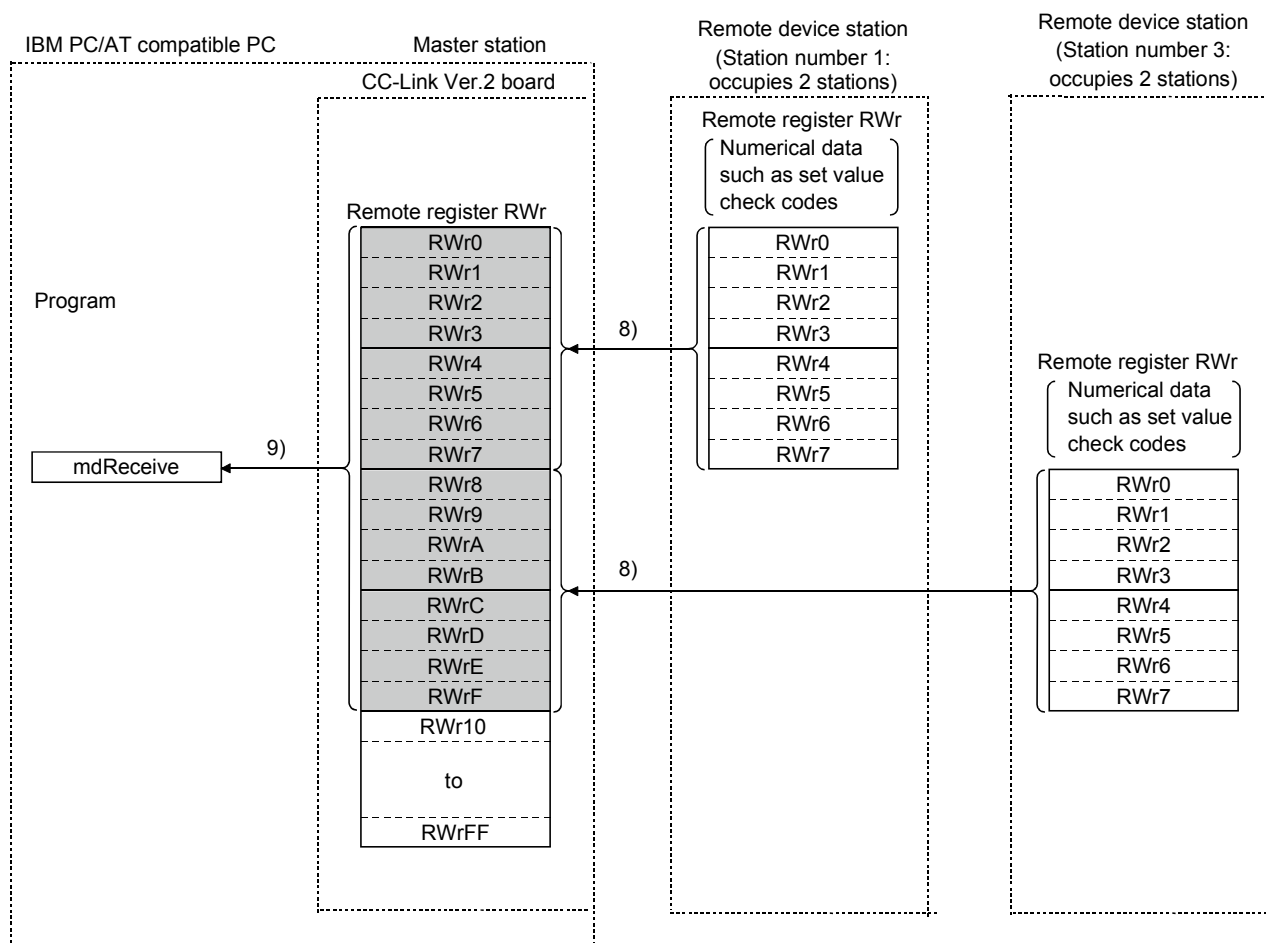
[Remote register RWr when the AJ65BT-64DAV is set to station number 1]

Signal direction: AJ65BT-64DAV → Master module	
Address	Description
RWr0	CH1 set value check code
RWr1	CH2 set value check code
RWr2	CH3 set value check code
RWr3	CH4 set value check code
RWr4	Error code
RWr5	Not used
RWr6	
RWr7	

4.2.3 Communication with the local stations

The following explains an overview of the communication between the master station and the local stations.

(1) Communication between the master station and the local stations by cyclic transmission

The data communication between programmable controller CPUs and personal computers can be performed in n:n mode using the remote input RX and remote output RY (bit information used in local station systems) as well as the remote register RWw and remote register RWr (word information for writing and reading used in local station systems).
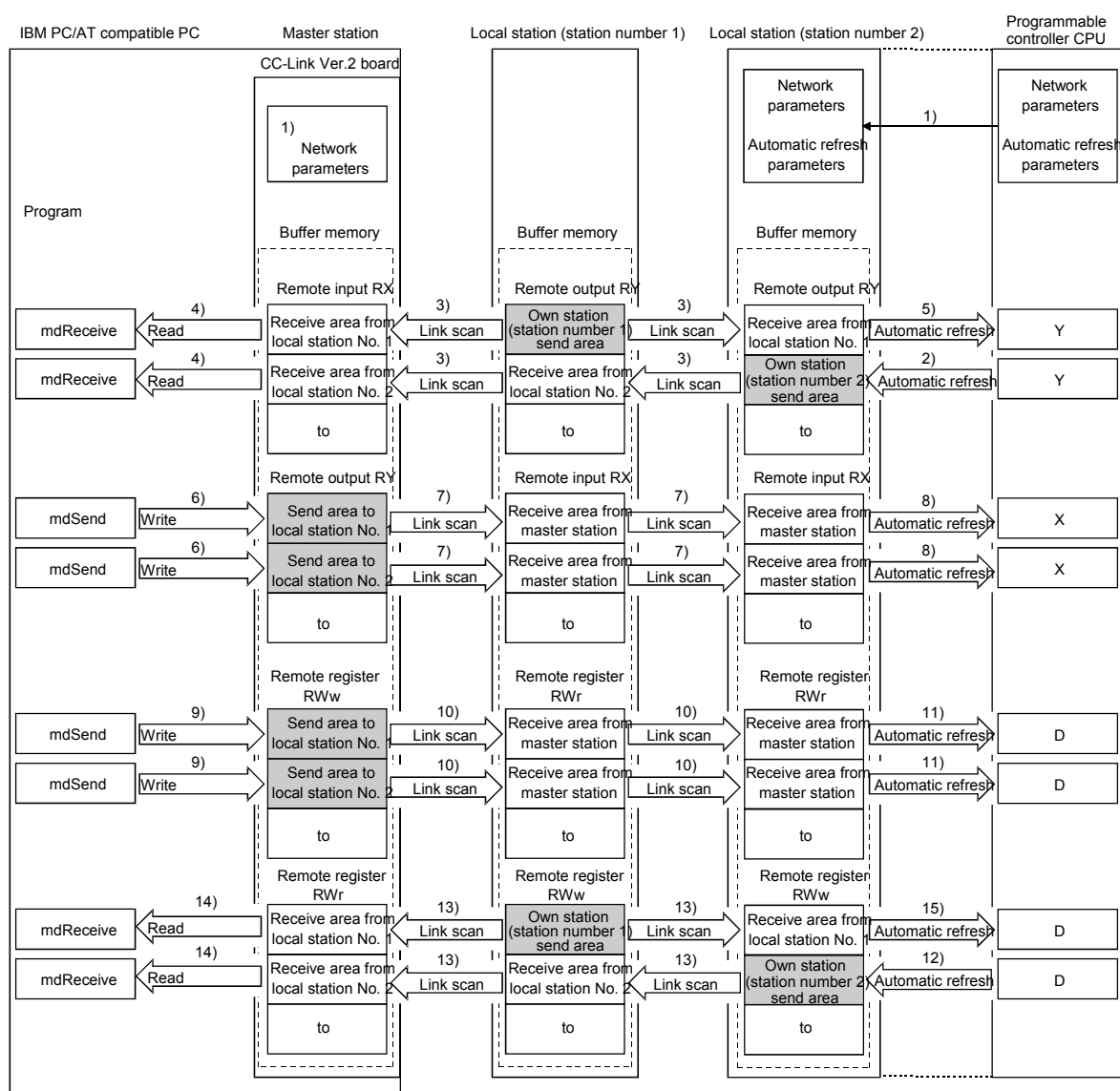
POINT
The master station only sends data to stations where datalink has been started. The master station does not send any data to stations where datalink has not been started.

[Data link startup]

1) When the personal computer is powered on, the CC-Link system automatically starts up in accordance with the network parameters set by the CC-Link Ver.2 utility.

[On/off information from a local station to the master station or another local station]

2) The on/off information of the CPU device set with automatic refresh parameters is stored in the "remote output RY" buffer memory of a local station. The remote output RY is used as the output information to be used by the local station system.

3) The information in the "remote output RY" buffer memory of the local station is automatically stored (for each link scan) in the "remote input RX" buffer memory of the master station and the "remote output RY" buffer memory of another local station.

4) The program uses the mdReceive function to read the input status stored in the "remote input RX" buffer memory.
The remote input RX is used as the input information to be used by the local station systems.

5) The input status stored in the "remote output RY" buffer memory is stored in the CPU device set with automatic refresh parameters.

▌ ⋯⋯⋯The last two bits cannot be used in the communication between the master station and the local stations.
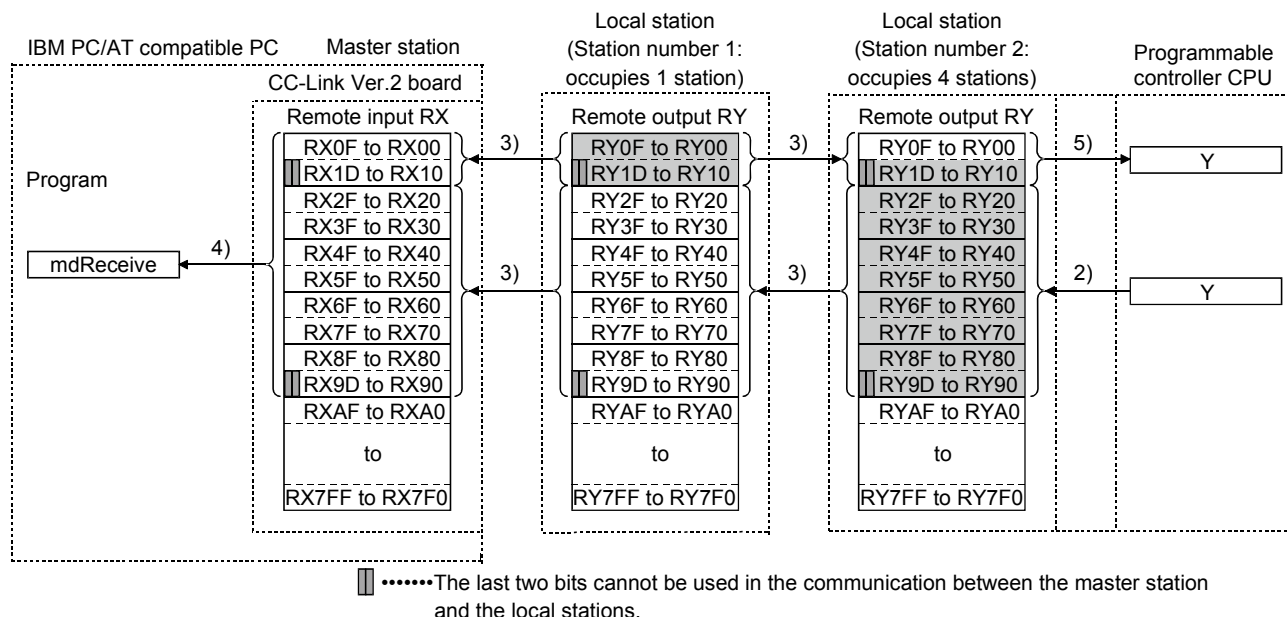
[On/off information from the master station to the local stations]

6) The program uses the mdSend function to write the on/off information to the "remote output RY" buffer memory of the master station.

7) The information in the "remote output RY" buffer memory is automatically stored (for each link scan) in the "remote input RX" buffer memory of each of the local stations.

8) The input status stored in the buffer memory "remote input RX" is stored in the CPU device set with automatic refresh parameters.
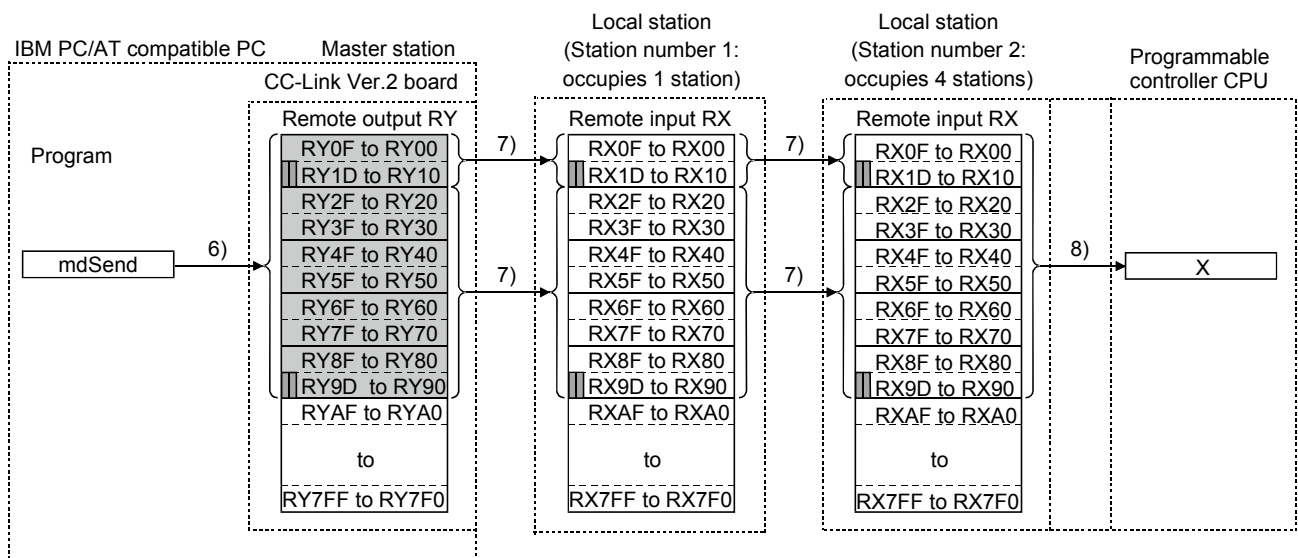
▌ ••••••••The last two bits cannot be used in the communication between the master station and the local stations.

[Word information from the master station to all local stations]

9) The program uses the mdSend function to write the word information to the "remote register RWw" buffer memory of the master station.
The remote register RWw is used as the word information for writing to be used by local station systems.

10) The information in the "remote register RWw" buffer memory is automatically stored (for each link scan) in the "remote registers RWr" of all local stations. The remote register RWr is used as the word information for reading to be used by local station systems.

11) The word information stored in the "remote register RWr" buffer memory is stored in the CPU device set with automatic refresh parameters.
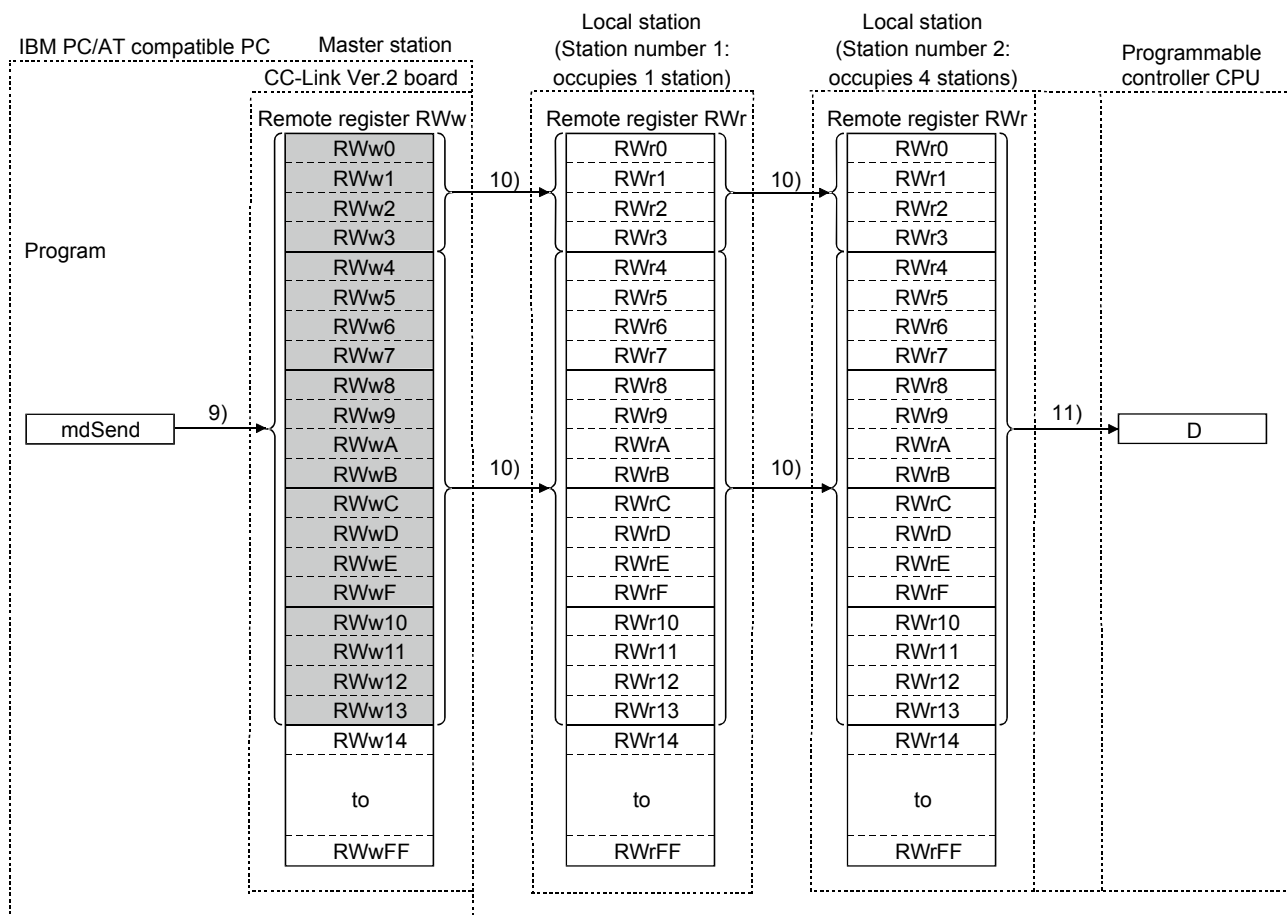
[Word information from a local station to the master station and another local station]

12) The word information set with automatic refresh parameters is stored in the "remote register RWw" buffer memory of a local station. However, it can only be stored in the area corresponding to the station number of the own station.

13) The information in the "remote register RWw" buffer memory is automatically stored (for each link scan) in the "remote register RWr" of the master station and the "remote register RWw" of another local station.

14) The program uses the mdReceive function to read the word information stored in the "remote register RWw" buffer memory.

15) The word information stored in the "remote register RWw" buffer memory is stored in the CPU device set with automatic refresh parameters.
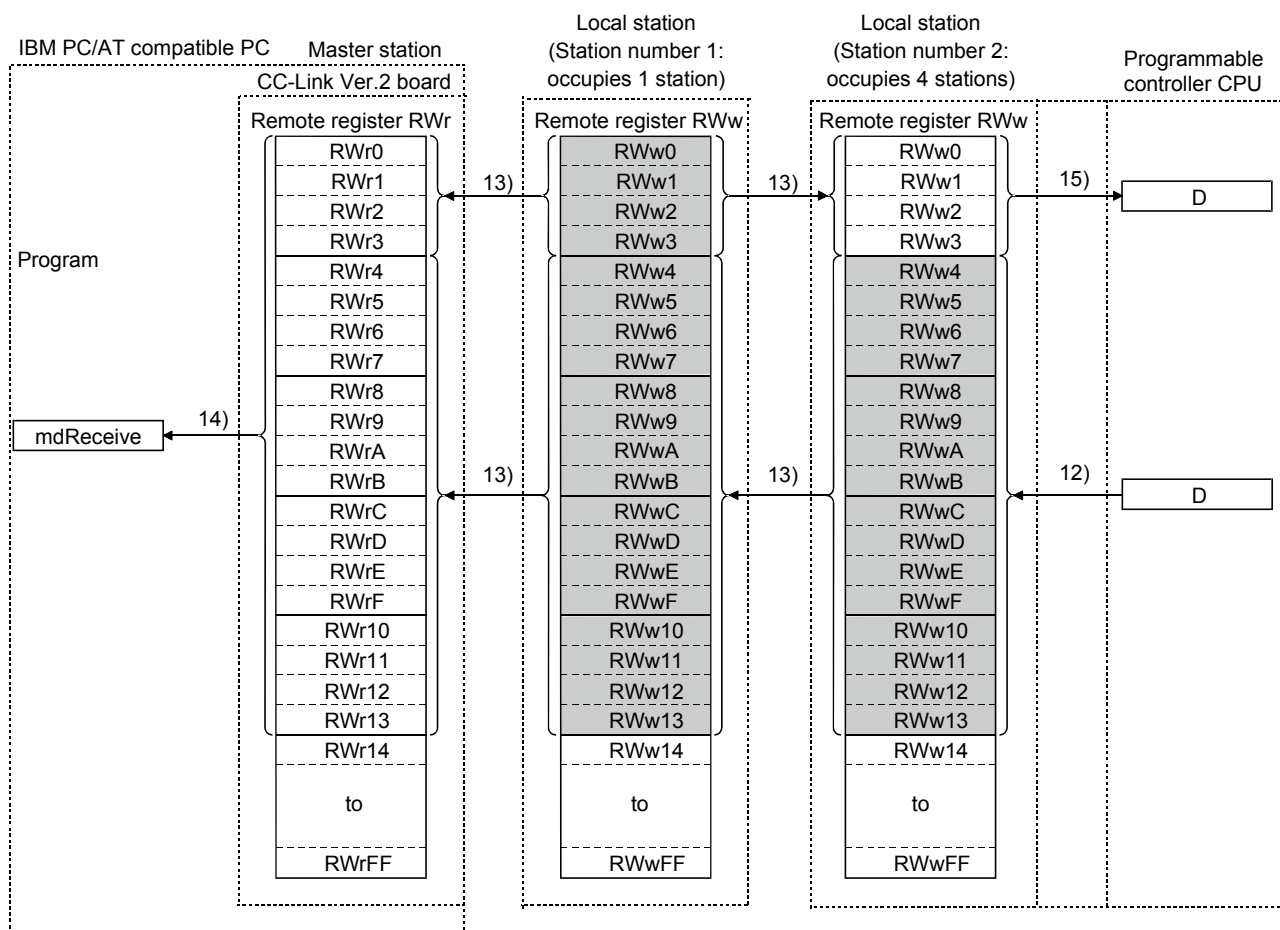
(2) Communication between the master station and the local station by transient transmission

The transient transmission is a transmission method that sends and receives data in 1 : 1 mode by designating the opposite station at an arbitrary timing.

[When writing data to the buffer memory of the local station and the CPU device using the mdSend function]

1) The program uses the mdSend function to write data from the master station to the designated buffer memory of the local station and a CPU device.

2) When writing is completed, 0 is stored as return values.

IBM PC/AT compatible PC   Master station

Program   CC-Link Ver.2 board   Local station   Programmable controller CPU

[mdSend] — 1)
Return value ← 2)

[mdSend] — 1)
Return value ← 2)

Buffer memory

D
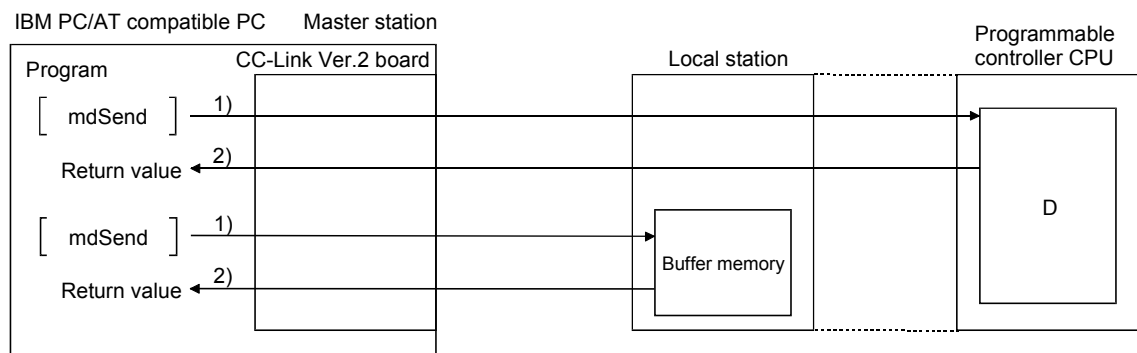
[When reading data from the buffer memory and CPU device in a local station using the mdReceive function]

1) The program uses the mdReceive function to read data from the designated buffer memory of the local station and the CPU device to the variables of the program in the master station.

2) When reading is completed, 0 is stored as return values.

IBM PC/AT compatible PC   Master station

Program   CC-Link Ver.2 board   Local station   Programmable controller CPU

[mdReceive] — 1)
Value, return value ← 2)

[mdReceive] — 1)
Value, return value ← 2)

Buffer memory

D
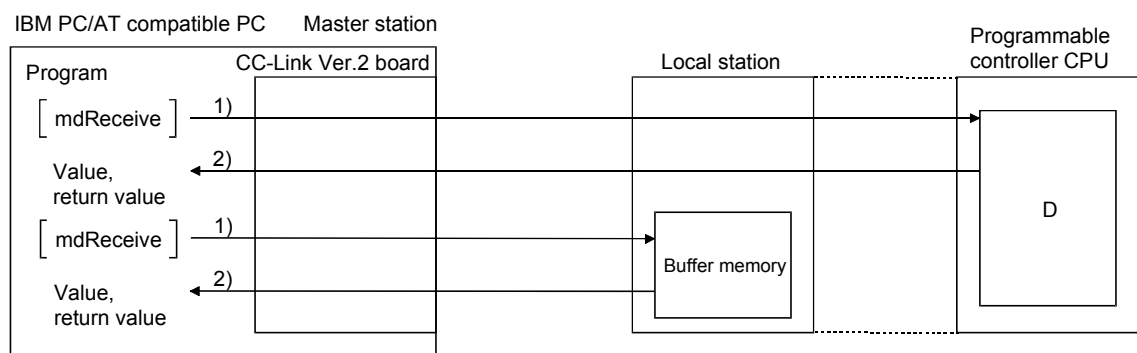
4.2.4 Communication with the intelligent device station

The following explains an overview of the communication between the master station and the intelligent device station.

(1) Communication between the master station and the intelligent device station by cyclic transmission

Handshaking signals with the intelligent device station (positioning complete, positioning start. etc.) are communicated using the remote input RX and remote output RY. Numeric data (positioning start number, present feed value, etc.) is communicated using the remote register RWw and remote register RWr.
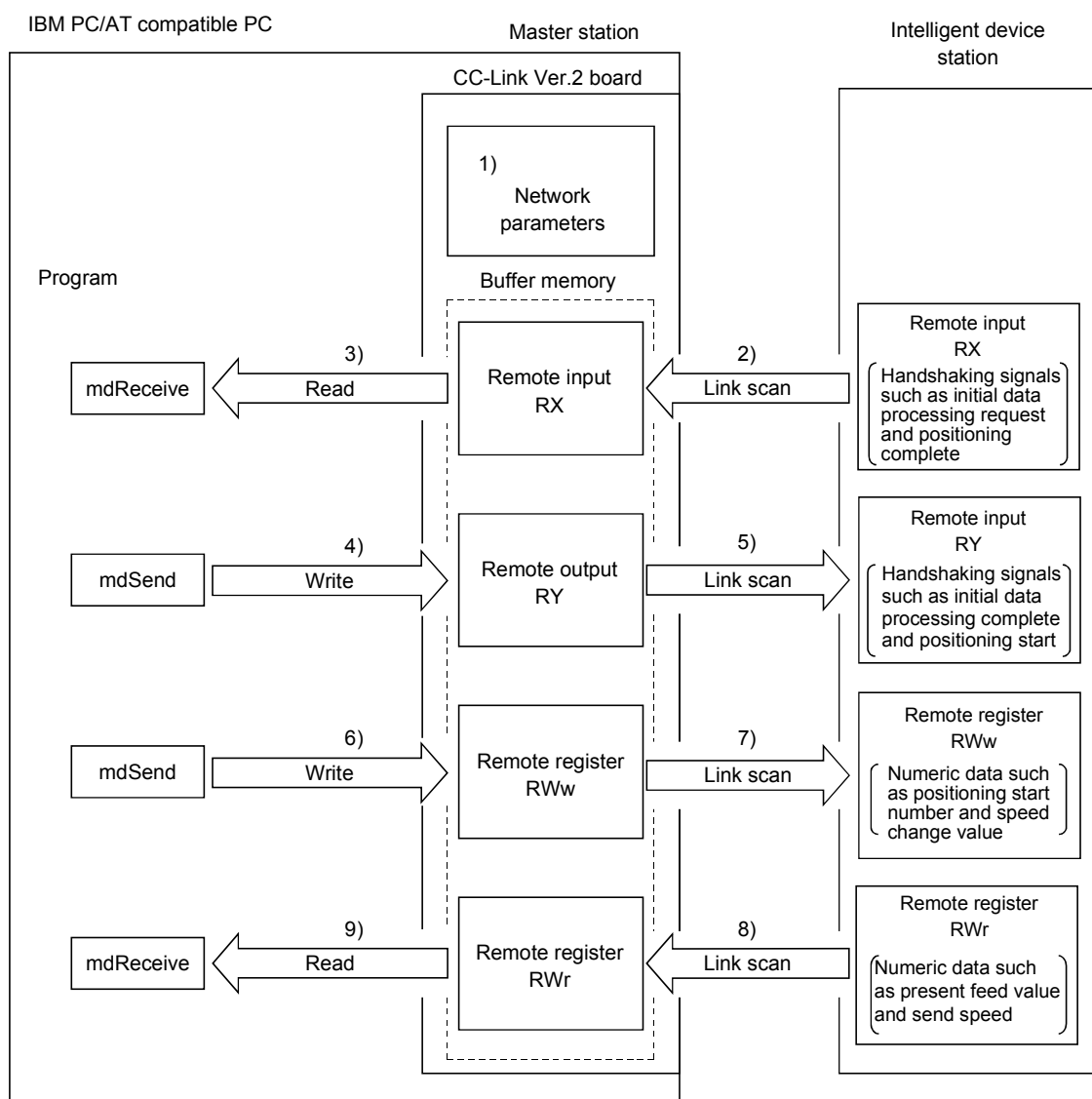
[Data link startup]

1) When the personal computer is powered on, the CC-Link system automatically starts up in accordance with the network parameters set by the CC-Link Ver.2 utility.

[Remote input]

2) The remote input RX of the intelligent device station is automatically stored (for each link scan) in the "remote input RX" buffer memory of the master station.

3) The program uses the mdReceive function to read the input status stored in the "remote input RX" buffer memory.

| IBM PC/AT compatible PC	Master station	Intelligent device station (Station number 1: occupies 4 stations)
	CC-Link Ver.2 board	Remote input RX Handshaking signals such as positioning complete
Program	Remote input RX	
	RX0F to RX00	RX0F to RX00
	RX1F to RX10	RX1F to RX10
	RX2F to RX20	RX2F to RX20
mdReceive ←3)	RX3F to RX30 ←2)	RX3F to RX30
	RX4F to RX40	RX4F to RX40
	RX5F to RX50	RX5F to RX50
	RX6F to RX60	RX6F to RX60
	RX7F to RX70	RX7F to RX70
	RX8F to RX80	
	to	
	RX7FF to RX7F0	
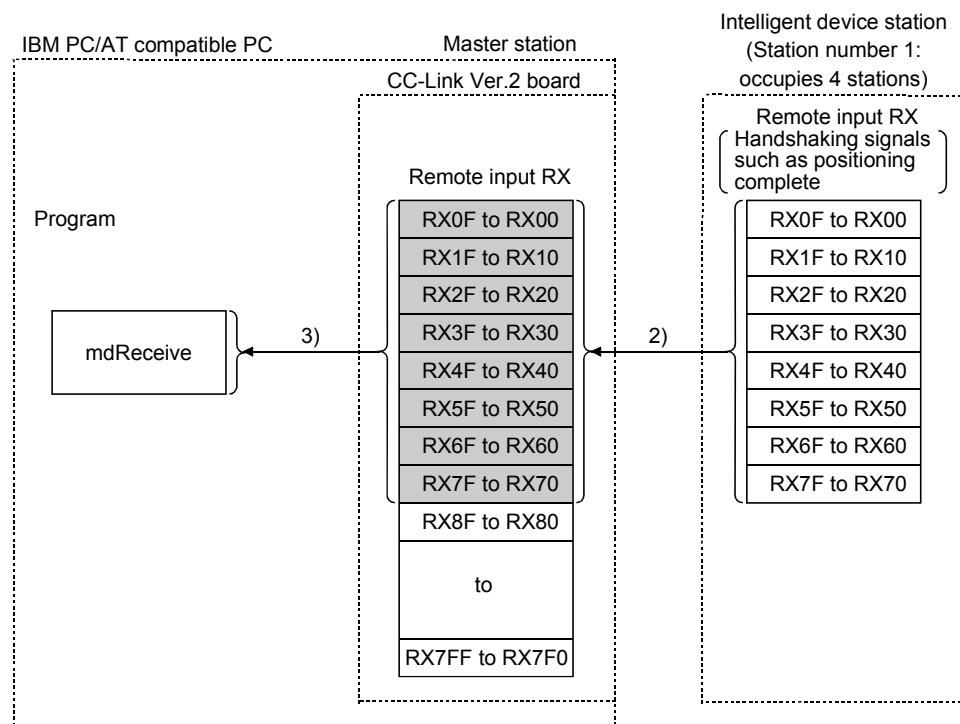
[Remote input RX when the AJ65BT-D75P2-S3 is
set to station number 1]

Signal direction: AJ65BT-D75P2-S3 → Master module	
Device No.	Signal name
RX00	D75P2 ready complete
RX01	Single-axis start complete
RX02	Dual-axes start complete
RX03	Use prohibited
RX04	Single-axis BUSY
RX05	Dual-axis BUSY
RX06	Use prohibited
RX07	Single-axis positioning complete
RX08	Dual-axis positioning complete
to	to

[Remote output]

4) The program uses the mdSend function to write the on/off information to the "remote output RY" buffer memory.

5) The remote output RY of the intelligent device station is automatically set to on/off (for each link scan) according to the output status stored in the "remote output RY" buffer memory.

IBM PC/AT compatible PC	Master station CC-Link Ver.2 board	Intelligent device station (Station number 1: occupies 4 stations)

Remote input RX

Remote input RX
Handshaking signals such as positioning complete

Program

mdSend	3) →	RY0F to RY00	2) →	RY0F to RY00
		RY1F to RY10		RY1F to RY10
		RY2F to RY20		RY2F to RY20
		RY3F to RY30		RY3F to RY30
		RY4F to RY40		RY4F to RY40
		RY5F to RY50		RY5F to RY50
		RY6F to RY60		RY6F to RY60
		RY7F to RY70		RY7F to RY70
		RY8F to RY80		
		to		
		RY7FF to RY7F0		
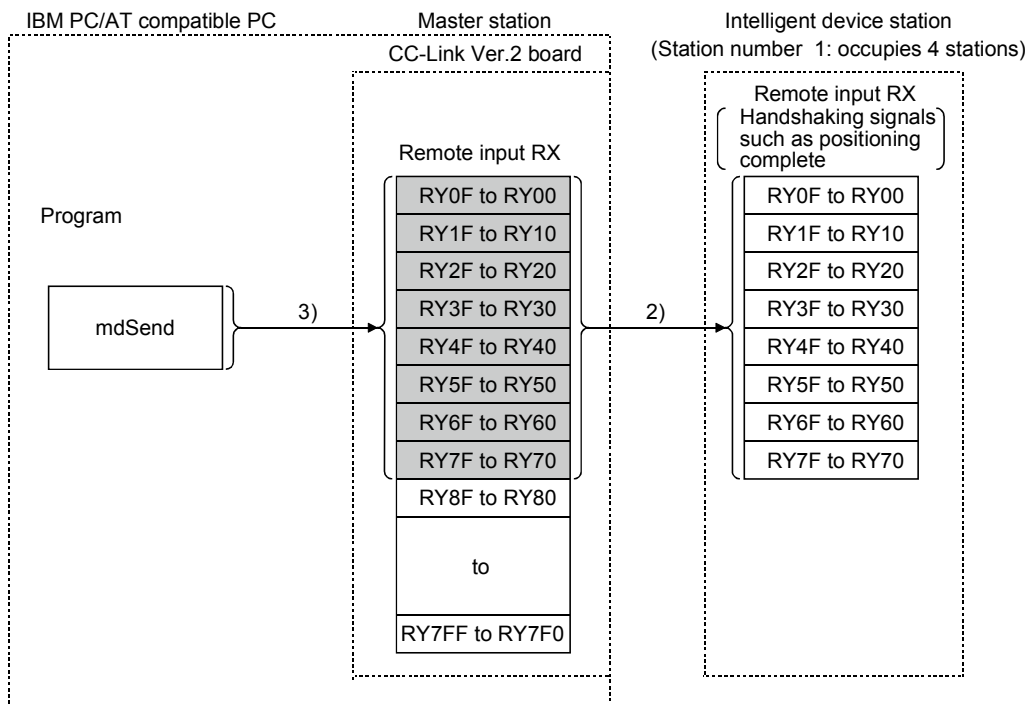
[Remote output RY when the AJ65BT-D75P2-S3 is set to station number 1]

Signal direction: AJ65BT-D75P2-S3 → Master module	
Device No.	Signal name
RY01 to RY0F	Use prohibited
RY10	Single-axis positioning start
RY11	Dual-axis positioning start
RY12	Use prohibited
RY13	Single-axis stop
RY14	Dual-axis stop
to	to

[Writing to the remote register RWw]

6) The program uses the mdSend function to write the sending data to the "remote register RWw" buffer memory.

7) The data stored in the "remote register RWw" buffer memory is automatically sent to the remote register RWw of the intelligent device station.
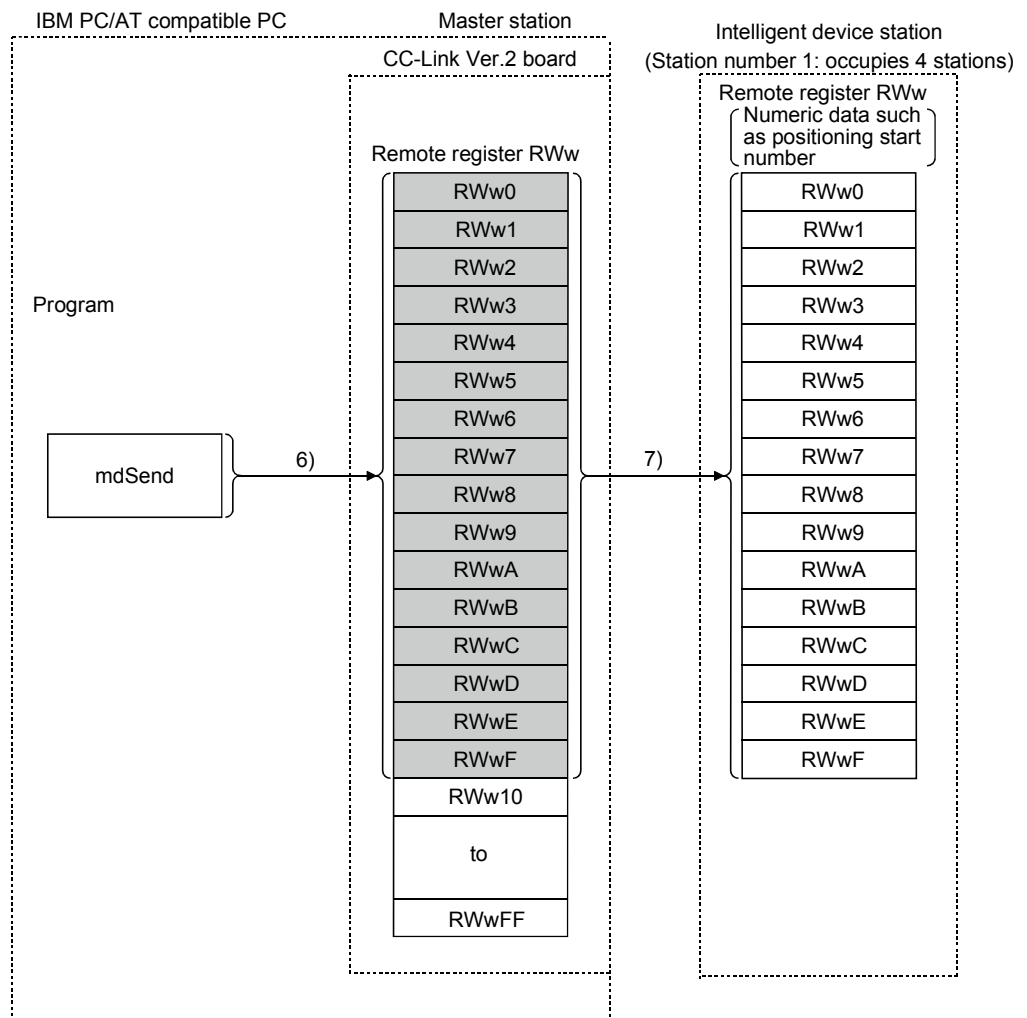
IBM PC/AT compatible PC   Master station
               CC-Link Ver.2 board

Intelligent device station
(Station number 1: occupies 4 stations)

Program

Master station	Intelligent device station
Remote register RWw	Remote register RWw (Numeric data such as positioning start number)
RWw0	RWw0
RWw1	RWw1
RWw2	RWw2
RWw3	RWw3
RWw4	RWw4
RWw5	RWw5
RWw6	RWw6
RWw7	RWw7
RWw8	RWw8
RWw9	RWw9
RWwA	RWwA
RWwB	RWwB
RWwC	RWwC
RWwD	RWwD
RWwE	RWwE
RWwF	RWwF
RWw10	
to	
RWwFF	

mdSend → 6) →   7) →

[Remote register RWw when the AJ65BT-D75P2-S3 is set to station number 1]

Signal direction: Master module → AJ65BT-D75P2-S3	
Address	Description
RWw0	Single-axis positioning start number
RWw1	Single-axis override
RWw2	Single-axis new present value
RWw3	
RWw4	Single-axis new speed value
RWw5	
RWw6	Single-axis JOG speed
RWw7	
to	to

[Reading from the remote register RWr]

8) The remote register RWr data of the intelligent device station is automatically stored in the "remote register Rwr" buffer memory of the master station.

9) The program uses the mdReceive function to read the remote register RWr data of the intelligent device station stored in the "remote register RWr" buffer memory.
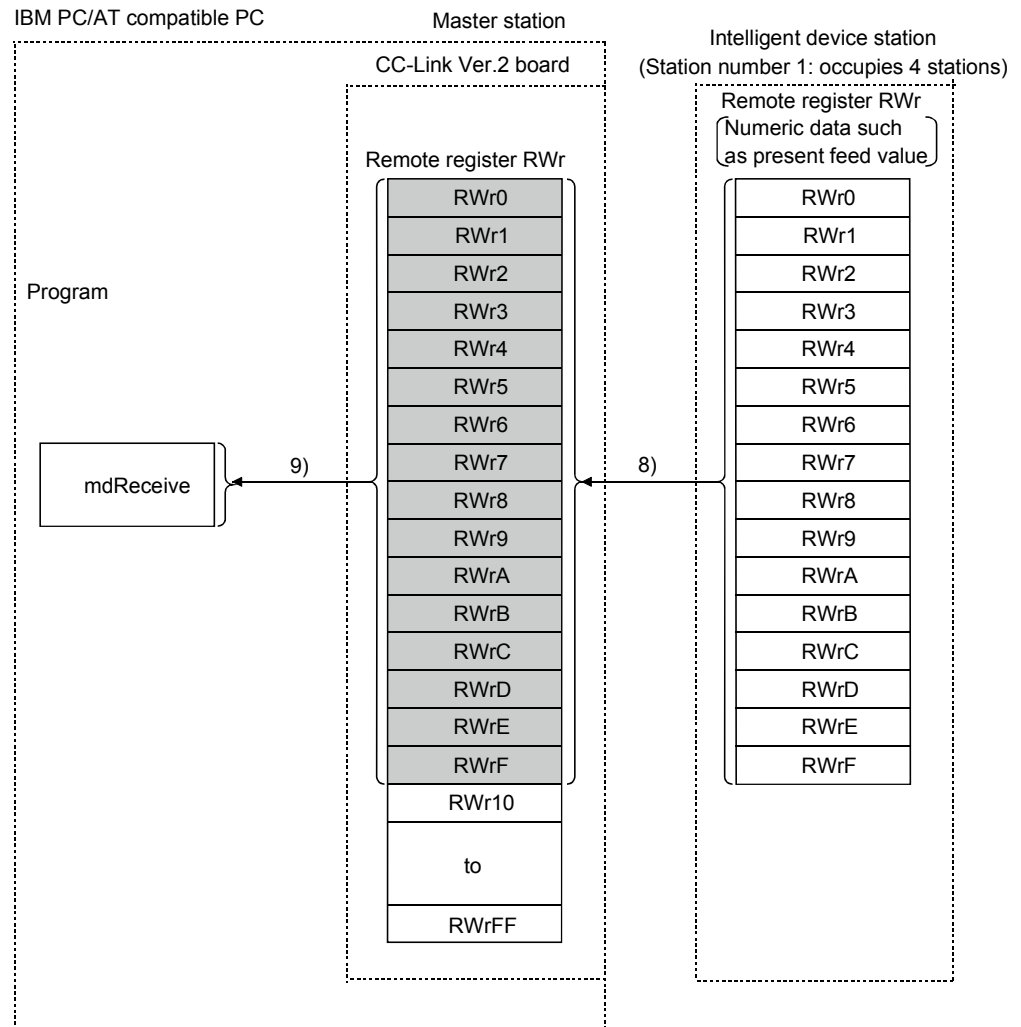
[Remote register RWw when the AJ65BT-D75P2-S3 is set to station number 1]

Signal direction: AJ65BT-D75P2-S3 → Master module	
Address	Description
RWr0	Single-axis present feed value
RWr1	
RWr2	Single-axis feed speed
RWr3	
RWr4	Single-axis valid M code
RWr5	Single-axis error number
RWr6	Single-axis warning number
RWr7	Single-axis operating status
to	to

(2)   Communication between the master station and the intelligent device station by transient transmission

The transient transmission is a transmission method that sends and receives data in 1 : 1 mode by designating an opposite station at an arbitrary timing.

[When writing data to the buffer memory of the intelligent device station using the mdSend function]

1)   The program uses the mdSend function to write data from the master station to the designated buffer memory of the intelligent device station.

2)   When writing is completed, 0 is stored as a return value.
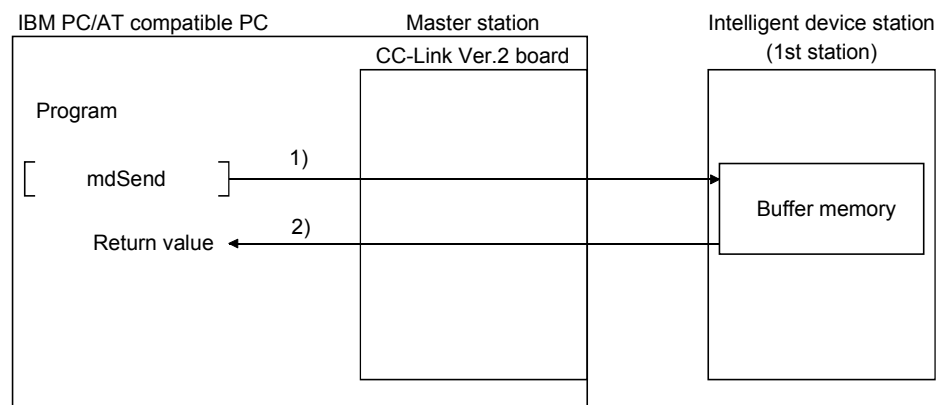
```
IBM PC/AT compatible PC              Master station          Intelligent device station
                                    CC-Link Ver.2 board              (1st station)

  Program

         ⌈                      1)
           mdSend          ⌉  ──────────────────────────────▶
                                                                   Buffer memory
         Return value  ◀─────  2)  ──────────────────────────
```

[When reading data from the buffer memory of the intelligent device station using the mdReceive function]

1)   The program uses the mdReceive function to read data from the designated buffer memory of the intelligent device station to the variables of the program in the master station.

2)   When reading is completed, 0 is stored as a return value.

```
IBM PC/AT compatible PC              Master station          Intelligent device station
                                    CC-Link Ver.2 board              (1st station)
  Program

         ⌈                      1)
           mdReceive       ⌉  ──────────────────────────────▶
                                                                   Buffer memory
   Value, return value  ◀─────  2)  ──────────────────────────
```
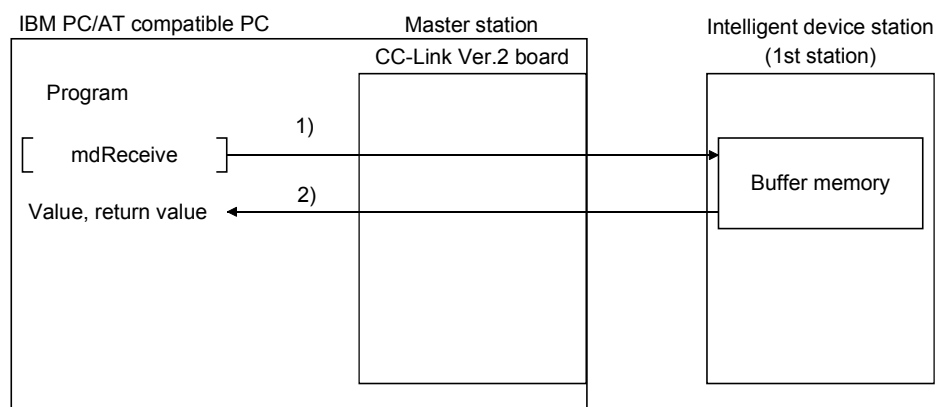
4.3 Functions for Improving System Reliability

This section explains how to use the functions for improving the reliability of the CC-Link system.

4.3.1 Disconnecting a data link faulty station and continuing the data link with only normal stations (slave station disconnect function)

This function disconnects any of the remote stations, local stations, intelligent device stations, and standby master station if it has become data link faulty due to power off or other cause, and continues the data link among normal remote stations, local stations, intelligent device stations, and standby master station (no setting is required).

```
┌──────────┐        ┌──────────────┐  Down  ┌──────────┐ ┌──────────┐
│  Master  │        │Remote station│   ╳    │  Local   │ │  Local   │
│ station  │        └──────────────┘ Remote │ station  │ │ station  │
│          │                         station │          │ │          │
└──────────┘                                 └──────────┘ └──────────┘
   ■                                                         ■
Terminal                                                 Terminal
resistor                                                 resistor
```

```
┌──────────────────────────────────────────┐
│   Continues data link excluding faulty station   │
└──────────────────────────────────────────┘
```

┌───┐
│ POINT   │
│   │
│ In the event of a cable breakdown, the data link cannot be performed because │
│ there is no terminal resistor.   │
│   │
│ ┌──────────┐   ┌──────────────┐ ┌──────────────┐ ┌──────────┐ ┌──────────┐ │
│ │ Master │   │Remote station│ │Remote station│ │ Local   │ │ Local   │ │
│ │ station │   └──────────────┘ └──────────────┘ │ station │ │ station │ │
│ └──────────┘   └──────────┘ └──────────┘ │
│   ■   ╳   ■   │
│ Terminal   Breakdown   Terminal   │
│ resistor   resistor   │
└───┘

4.3.2 Automatically reconnecting a disconnected data link faulty station when it returns to normal (auto return function)

This function allows any of the remote stations, local stations, intelligent device stations, and standby master station that has been disconnected from the data link due to power off or other cause to automatically reconnect to the data link when it returns to the normal status.

[Setting method]

The setting is performed at <<Parameter settings>> in the CC-Link Ver.2 utility. For more details on the setting, refer to Section 9.2.5.

4.3.3 Retaining the device status of a data link faulty station (setting the input data status from a data link faulty station)

This function sets the input (reception) data status from a data link faulty station.

(1) Target input (reception) data
The following shows the target buffer memory areas.

■ •••••• Target areas for clear/latch

■ •••••• Areas retained regardless of the setting
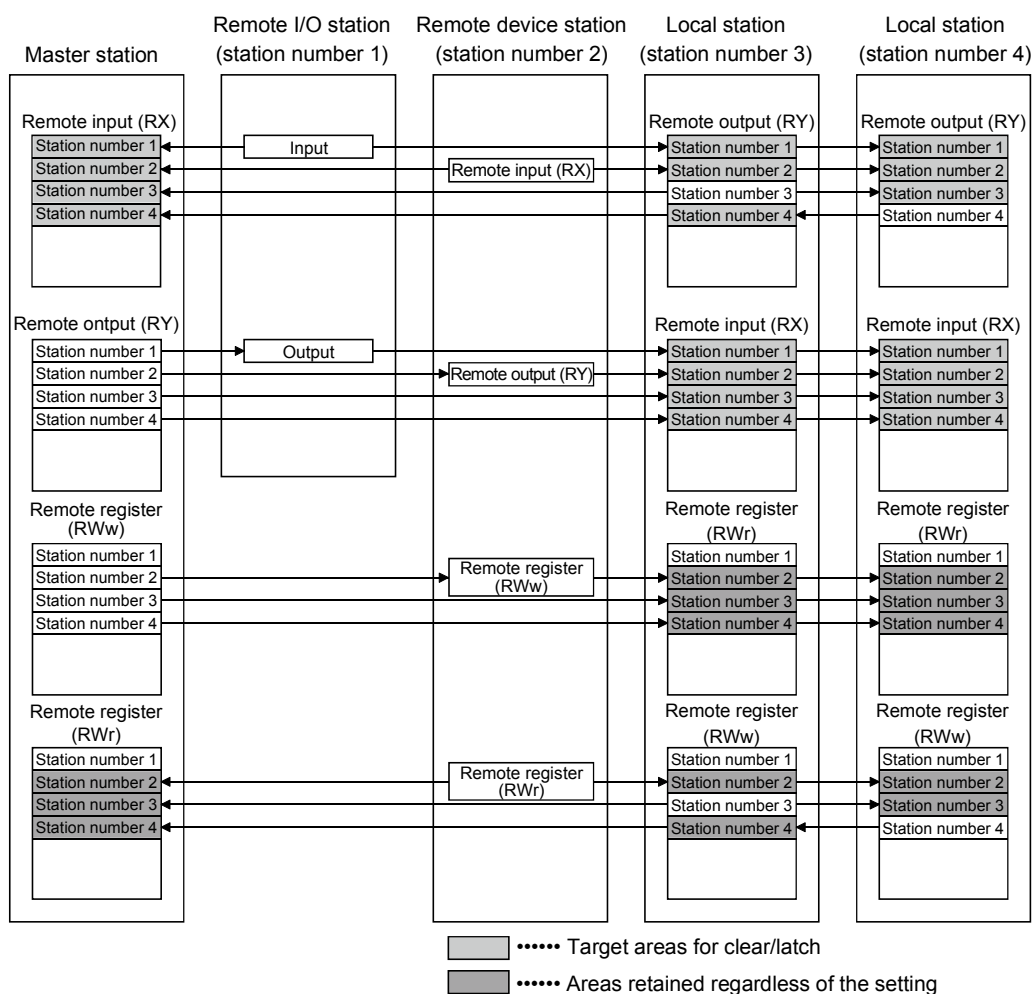
The remote input RX in the master station, and the remote input RX and remote output RY in the local stations will either clear or retain the data from faulty stations according to the setting. The remote register RWr in the master station and the remote registers RWw and RWr in the local stations retain data from faulty stations regardless of the setting.

```
POINT
```
When a data link faulty station is set as an error invalid station, the input data (remote input RX and remote output RY) from that station is retained regardless of the setting.

(2) Setting method
The setting is performed at <<Parameter settings>> in the CC-Link Ver.2 utility. For more details on the setting, refer to Section 9.2.3.

4.3.4 Continuing the data link even when the master station is faulty (standby master function)

This function enables the data link to continue by switching a faulty master station to a standby master station (i.e. a backup station for the master station).

Note that, even if the master station has been restored, automatic switching from the standby master station to the master station is not performed.

Data link control
by the master station
Master station

Standby master station
Station number 1
Number of occupied stations: 1

Data link control
in progress

Remote I/O station
Station number 2
Number of occupied stations: 1

Remote I/O station
Station number 3
Number of occupied stations: 1

Standby

Cyclic communication   Cyclic communication   Cyclic communication

Master station is down→Data link control by the standby master station
Master station

Standby master station
Station number 1
Number of occupied stations: 1

Remote I/O station
Station number 2
Number of occupied stations: 1

Remote I/O station
Station number 3
Number of occupied stations: 1

Data link control
in progress

Cyclic communication   Cyclic communication   Cyclic communication

In this section, the above system configuration will be used in the explanation.

POINT

Refer to "Section 2.2.2 (1)" for the combinations when using the CC-Link Ver.2 board as the standby master station.

(1) Overview of link data transmission when the standby master function is used

The following provides an overview of link data transmission when the standby master function is used.

(a) "Master station output" while the master station is controlling the data link
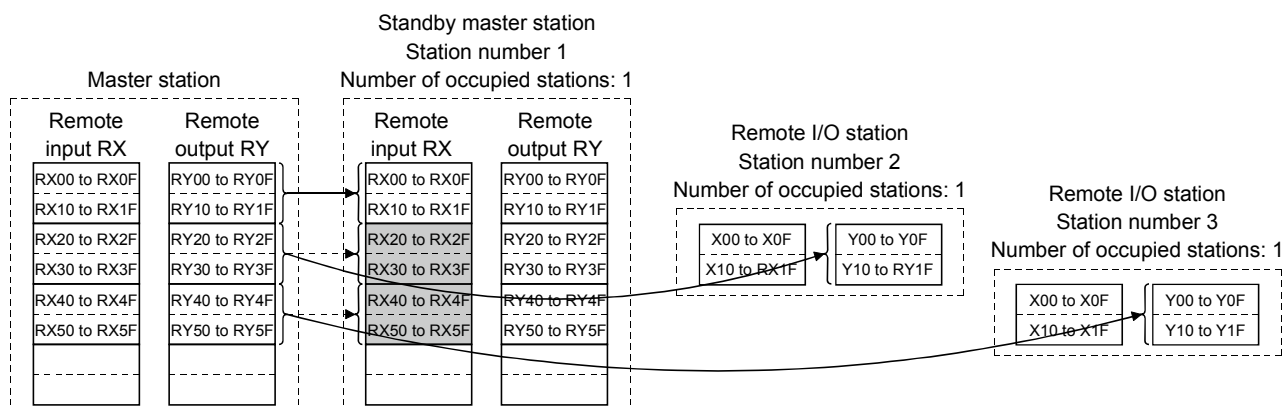
The master station data sent to the remote input RX in the standby master station (shown by the shaded areas in the figure above) is used as the output information when the master station becomes faulty; thus, it should be transferred to another device using a sequence program.

In addition, when the master station becomes faulty, the transferred data is transferred to the remote output RY of the standby master station using a sequence program.

(b) "Master station input" while the master station is controlling the data link
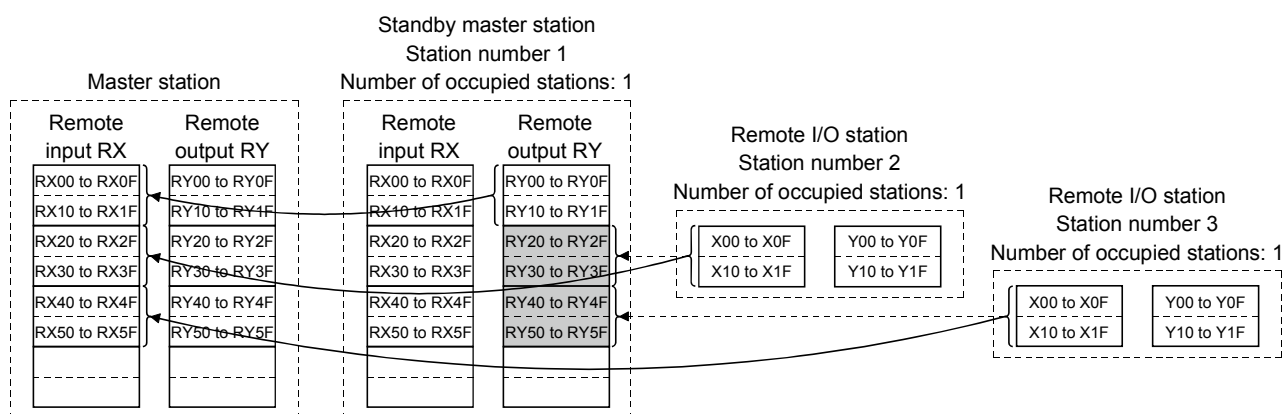
The remote I/O station data sent to the remote output RY of the standby master station is being used by the standby master station as the input information when the standby station operates as a local station; thus, it does not need to be transferred to another device.

(c) "Standby master station output" when the master station is down and the standby master station is controlling the data link
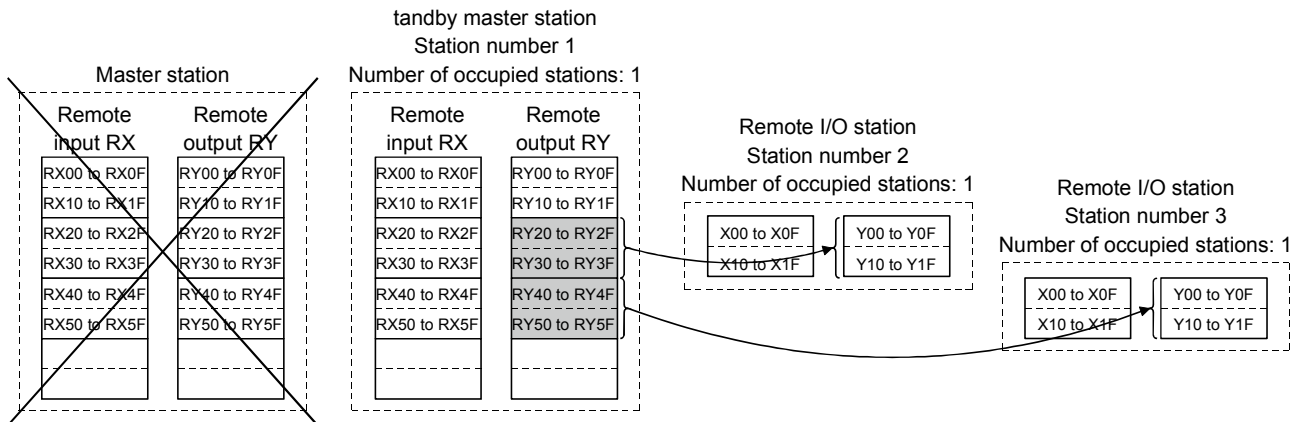
The data sent to the remote output RY of the standby master station by a sequence program is sent to the remote I/O stations as output information.

(d) "Standby master station input" when the master station is down and the standby master station is controlling the data link
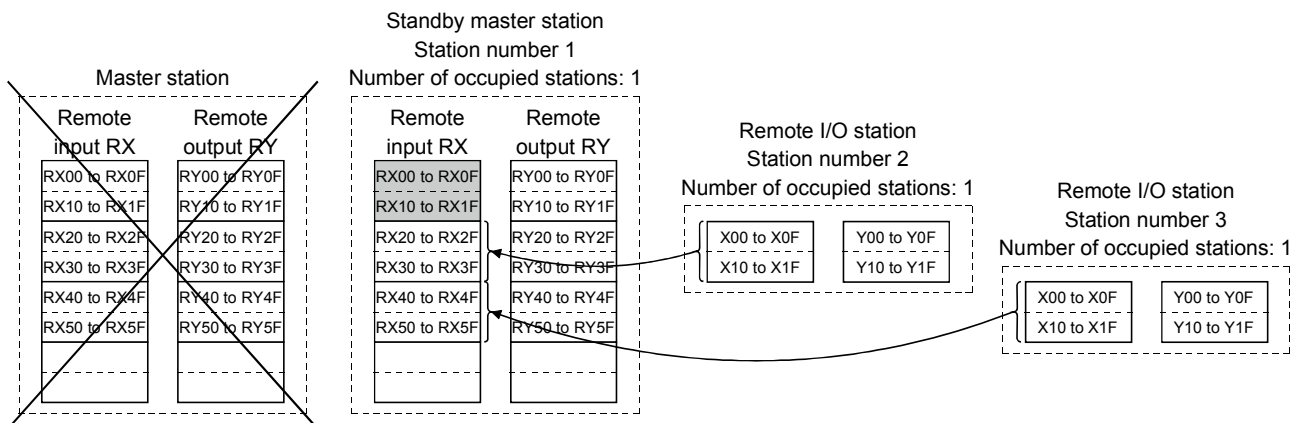
The data shown in the shaded areas in the standby master station is either input or retained according to the "Data link faulty station setting" in network parameters.

(2)   Setting method
The setting is performed at <<Parameter settings>> in the CC-Link Ver.2 utility.
Refer to Section 9.2.5 for details.

(a)   Setting the master station
1)   Set the "Sta.No." and "Type" in <<Parameter settings>>.
Sta.No.:0
Type: Master station
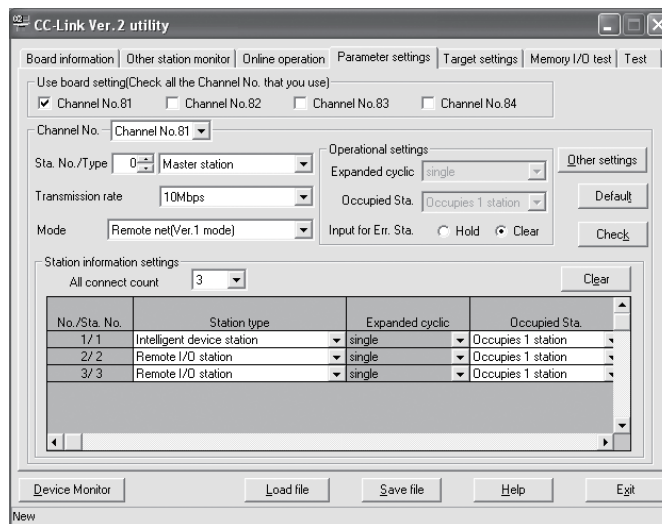
2)   Set the "Standby master station" with the Other settings button.
Setting range: 1 to 64 (No standby master station specified for blank)
Default: 0 (No standby master station specified)
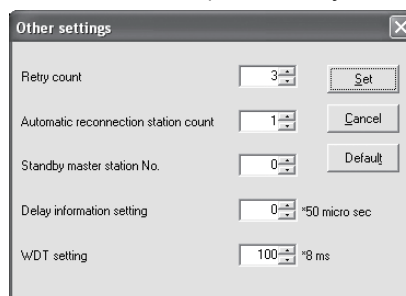
3)   Select the "Ver.1 Intelligent device station" or "Ver.2 Intelligent device station" for "Type" of the station information.
Make a selection according to the mode set in "Mode setting".

(b) Setting the standby master station

Set the same "Standby master station number" as the one set in the master station to "Sta. No." in <<Parameter settings>> and set "Standby master station" for "Type".

For "Mode setting", select the same mode as the one set in "Mode setting" of the master station.
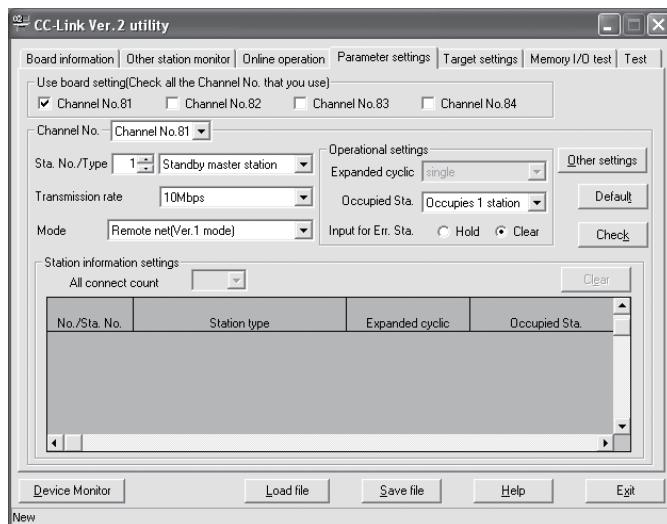
(3) Notes on using the standby master function

(a) Only one standby master station is allowed in a single data link system.

(b) The total number of stations can be no more than 64, including the standby master station. The number of stations that can be occupied by the standby master station is one or four.

(c) Do not specify station number 64 for a system in which a standby master station exists.
If it is specified, station number 64 cannot communicate normally.

(d) If any abnormality is detected at the master station in the initial status (before parameter communication starts), the switch to the standby master station will not be executed.

(e) When the master station becomes faulty, the data link control will automatically be transferred to the standby master station, but the cyclic transmission data will not be transferred. Perform this transfer with a user program.
Once permitted, the information before the detection of abnormality at the master station will be output to each station.

(f) The master station duplex function is not available.
The control is switched from the standby master station to the master station only once.
Therefore, if the standby master station goes down after the control has been switched to the standby master station due to master station failure, the CC-Link system will stop the data link. (The control will not be switched even if the master station functions properly.)

(g) When the master station goes down and the data link control right is switched to the standby master station, the standby master station number is identified an error number (Corresponding bits in SB0080 or SW0080 to SW0083 turn ON.)
Specifying a standby master station as an error invalid station prevents this kind of error detection.

(h) When the standby master station is controlling the data link, parameters cannot be updated.

(i) If the terminal block of the master station is removed and then replaced in its original position without turning the power off while the master station is controlling the data link, both the master and standby master stations will attempt to operate as master stations and an error will occur. (The "ERR." LED will be flicker.)

(j) When a programmable controller is set as the master station, a CC-Link Ver.2 board cannot be specified as a standby master station.

(4)   Special link relays/registers (SB and SW) related to the standby master function

The following explains the special link relays and registers related to the standby master function.

They are stored in the buffer memory.

(a)   Special link relays (SB)

The special link relays (SB) relating to the standby master function are as follows:

The numeric values in parentheses in the number column indicate buffer memory addresses and bit locations.

Example: When the buffer memory address is 5E0H and the bit location is 0: (5E0H, b0)

Table 4.5 List of special link relays related to the standby master function

Number	Name	Description	Applicability (○Applicable, ×Not applicable)	
			Master station	Standby master station
SB0001 (5E0H,b1)	Master station switching and data link startup	Switches the output information from the standby master station to the master station, and starts up the data link. Off : Without switching direction On : With switching direction	×	○
SB0042 (5E4H,b2)	Acknowledge status of master station switching and data link startup	Shows the acknowledge status of the data link startup switching direction from the standby master station to the master station. Off : Not acknowledged On : Direction acknowledged	×	○
SB0043 (5E4H,b3)	Complete status of master station switching and data link startup	Shows the complete status of the data link startup switching direction from the standby master station to the master station. Off : Not complete On : Switching complete	×	○
SB0070 (5E7H,b0)	Master station information	Shows the data link status. Off : Data link control by the master station On : Data link control by the standby master station	○	○
SB0071 (5E7H,b1)	Standby master station information	Indicates whether or not there is a standby master station. Off : No standby master station On : Standby master station exists	○	○

(b)   Special link registers (SW)

The following explains the special link registers (SW) related to the standby master function.

The numeric values in parentheses in the number column indicate buffer memory addresses.

Table 4.6 List of special link registers related to the standby master function

Number	Name	Description	Applicability (○Applicable, ×Not applicable)	
			Master station	Standby master station
SW0043 (643H)	Result of master station switching and data link startup	The execution result of the master station switching and data link startup direction by the SB0001 is stored. 0 : Normal Other than 0 : An error code is stored. (Refer to Section 17.3.5.)	×	○
SW0073 (673H)	Standby master station number	Stores the station number of the standby master station. 1 to 64	○	○

(5) Program example when the standby master function is used

The following shows a program example when the standby master function is used.

```
void                    Change_StanbyMaster()
{                       short           Counter;        // General counter
                        short           StNo;           // Station number
                        unsigned short  DevType;        // Device type
                        short           DevNo;          // Device number
                        short           Size;           // Sending data size
                        short           RecvBuf[10];    // Buffer for receiving
                        unsigned short  ret;            // Return value

//Turn on SB1 (switching request)
                        StNo = 0xFF;            //Set the station number
                        DevType = 5;            //Set the device type (SB: equivalent to special M)
                        DevNo = 0x1;            //Set the device number
                        ret = mdDevSet(path,StNo,DevType,DevNo);
                        if(ret!=0)     {
                                printf("SBI ON processing failed, error code:%x\n",ret);
                                printf("Press any key\n");
                                getch();
                                mdClose(path);
                                exit(0);
                        }

                        for(Counter = 0;Counter < 100;Counter++){       // Confirm completion of switching
//Read SB (equivalent to special SM) 43)
                                Size = 2;               // Set the size of sending data
                                StNo = 0xFF;            // Set the station number
                                DevType = 5;            // Set the device type (SB: equivalent to special M)
                                DevNo = 0x20;           // Set the device number
                                ret = mdReceive(path,StNo,DevType,DevNo,&Size,&RecvBuf[0]);
                                if(ret!=0){
                                        printf("mdReceive[SB43 read] processing failed, error code:%xYn";ret);
                                        printf("Press any key\n");
                                        getch();
                                        mdClose(path);
                                        exit(0);
                                }
                                if((RecvBuf[0] & 0x0800)!=0)            // Exit from the loop if SB43 is on
                                        break;
                                Sleep(100);             // Wait for 100ms
                        }
// Confirm the time-out
        if(Counter>=100){
                        printf("[SB43]ON conformation timed out \n");
```

```
                                printf("Press any key\n");
                                getch();
                                mdClose(path);
                                exit(0);
                }
//Turn on SB1 (switching request)
                StNo = 0xFF;                    //Set the station number
                DevType = 5;                    //Set the device type (SB: equivalent to special M)
                DevNo = 0x1;                    //Set the device number
                ret=mdDevRst(path,StNo,DevType,DevNo);
                if(ret!=0)       {
                        printf("SBI ON processing failed, error code:%x\n",ret);
                        printf("Press any key\n");
                        getch();
                        mdClose(path);
                        exit(0);
                }

// Read SW (equivalent to special SD) 43 [switching result]
                Size = 2;                              // Set the size of sending data
                StNo = 0xFF;                           // Set the station number
                DevType = 14;                          // Set the device type (SD: equivalent to special D)
                DevNo=43;                              // Set the device number
                ret=mdReceive(path,StNo,DevType,DevNo,&Size,&RecvBuf[0]);
                if(ret!=0){
                        printf("mdReceive[SW43 read] processing failed, error code:%x\n",ret);
                        printf("Press any key\n");
                        getch();
                        mdClose(path);
                        exit(0);
                }
                if((RecvBuf[0] & 0x0800)!=0)                   // Exit from the loop if SB43 is on
                        break;
                Sleep(100);                       // Wait for 100ms
        }

        if(RecvBuf[0]!=0){                        // Exit when the switching result is abnormal
                printf("Failed to switch to the standby master station\n");
                printf("Press any key\n)
                getch();
                mdClose(path);
                exit(0);
        }
}
```

+--+
| POINT |
| |
| Use the paths that are already obtained in other processing for |
| the path parameters in the standby master switching sample |
| program. (They correspond to the path values obtained by |
| mdOpen.) |
+--+

4.4 Useful Functions

This section explains some useful functions for the CC-Link Ver.2 board.

4.4.1 Creating a program that contains modules to be added in the future (reserved station function)

This function prevents any of the remote stations, local stations, intelligent device stations and standby master station that is not actually connected (but that will be connected in the future) from being treated as a "data link faulty station" by the master and local stations.
When the master station is in the Remote net ver.2 mode, the number of points for a reserved station can be set to 0.
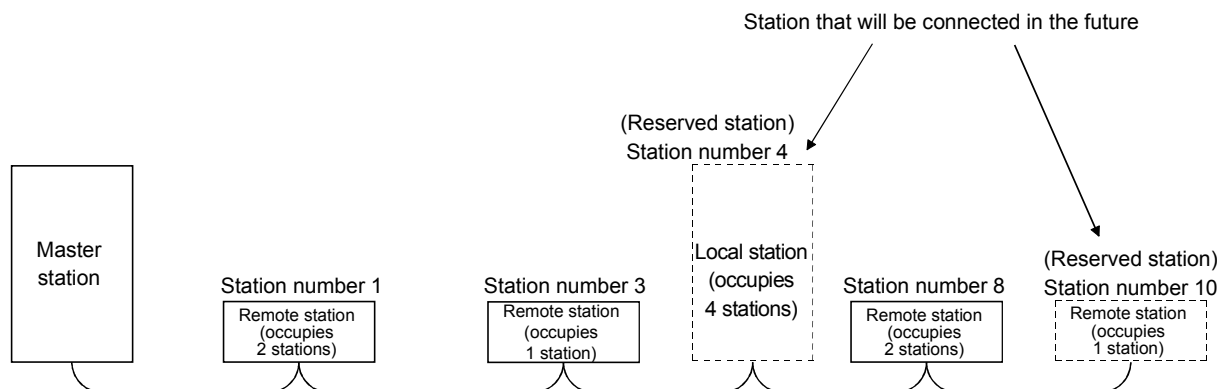

```
+-----------------------------------------------------------+
|  POINT                                                    |
+-----------------------------------------------------------+
| If any of the connected remote stations, local stations,  |
| intelligent device stations or standby master station is  |
| designated as a reserved station, the data link with that |
| station will become disabled.                             |
+-----------------------------------------------------------+
```

[Setting method]

The setting is performed at <<Parameter settings>> in the CC-Link Ver.2 utility. Refer to Section 9.2.5 for setting details.

4.4.2 Powering off a station in operation without detecting an error (error invalid station setting function)

By setting network parameter, this function prevents any of the remote stations, local stations, intelligent device stations and standby master station that is powered off in the system configuration from being treated as a "data link faulty station" by the master and local stations.

Note that if a station is set as an error invalid station, problems occurring in that station can no longer be detected.

In addition, the error invalid station settings cannot be changed while online because they are set with network parameters.

Stations to be set as error invalid stations
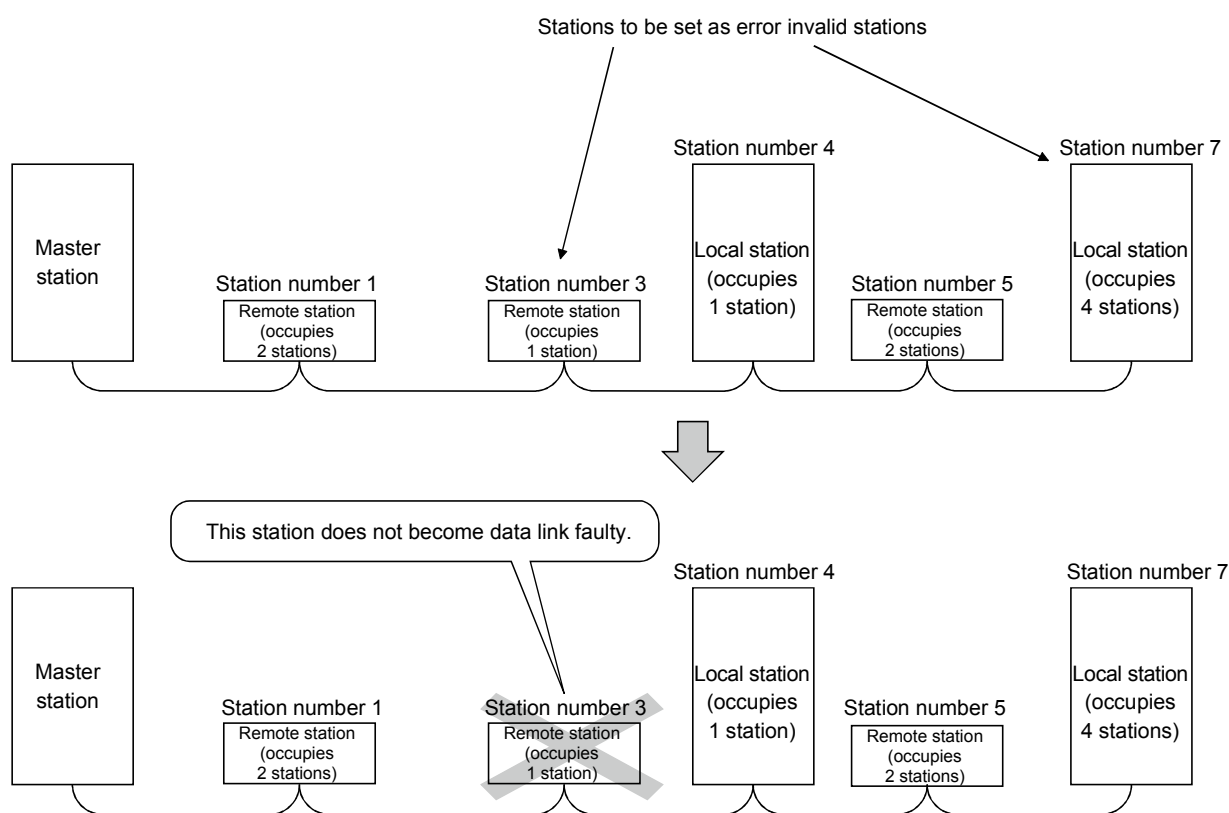
POINT
If any of the remote stations, local stations, intelligent device stations or standby master station that has been specified as an error invalid station is also "specified as a reserved station," the reserved station function overrides the error invalid station setting function.

[Setting method]

The setting is performed at <<Parameter settings>> in the CC-Link Ver.2 utility. Refer to Section 9.2.5 for setting details.

4.4.3 Checking operations for each station (data link stop/restart)

The circuit test (Hardware), circuit test (Software) and a Network test can be performed in the CC-Link Ver.2 utility.
For more details, refer to Section 9.2.8.

4.4.4 Station number duplicate check

This function checks whether or not multiple modules with the same station number exist in the system when the master station is started up.

1) When there is a duplicate station number, the "ERR." LED is lit, an error code is stored in the SW006A (switch setting status), and the SB006A turns on.
2) By correcting the switch setting to normal and restarting the data link, the "ERR." LED can be turned off and the data in the SW006A can be cleared.

4.4.5 Multiple CPU system support

By setting the logical station number using the CC-Link Ver.2 utility, any CPU of a multiple CPU system in which a QJ61BT11(N) is installed can be accessed by a personal computer in which a CC-Link Ver.2 board is installed.

<Access example>

Using logical station number "65," an access can be made from a personal computer in which a CC-Link Ver.2 board is installed to the CPU No. 4 via a QJ61BT11(N) (the control CPU is the CPU No.2).
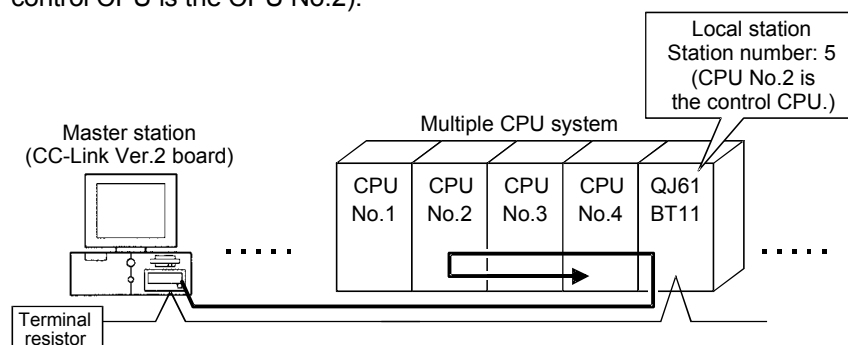
[Setting the logical station number]

Set the logical station number in the "Target" of the CC-Link Ver.2 utility.
For details on the "Target", refer to Section 9.2.6.
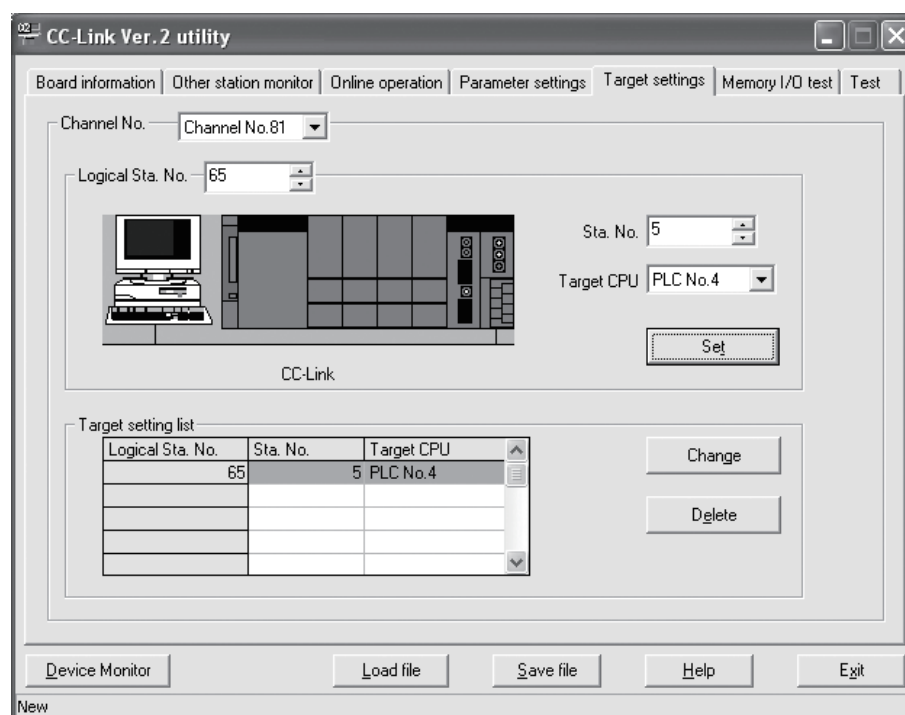
POINT
Use a QJ61BT11(N) of functional version B or later in order to access a multiple CPU system. A QJ61BT11(N) of functional version A cannot be used.

4.4.6 Reducing the reserved points of the remote I/O stations (Remote I/O station points setting)

The points of each remote I/O station can be set to 8, 16 or 32 points.
Therefore, only the points used for I/O need to be allocated for the remote devices in the CC-Link system and unused points can be reduced. It is effective for saving device points.
The remote I/O station points setting can be used in the remote net ver.2 mode only.
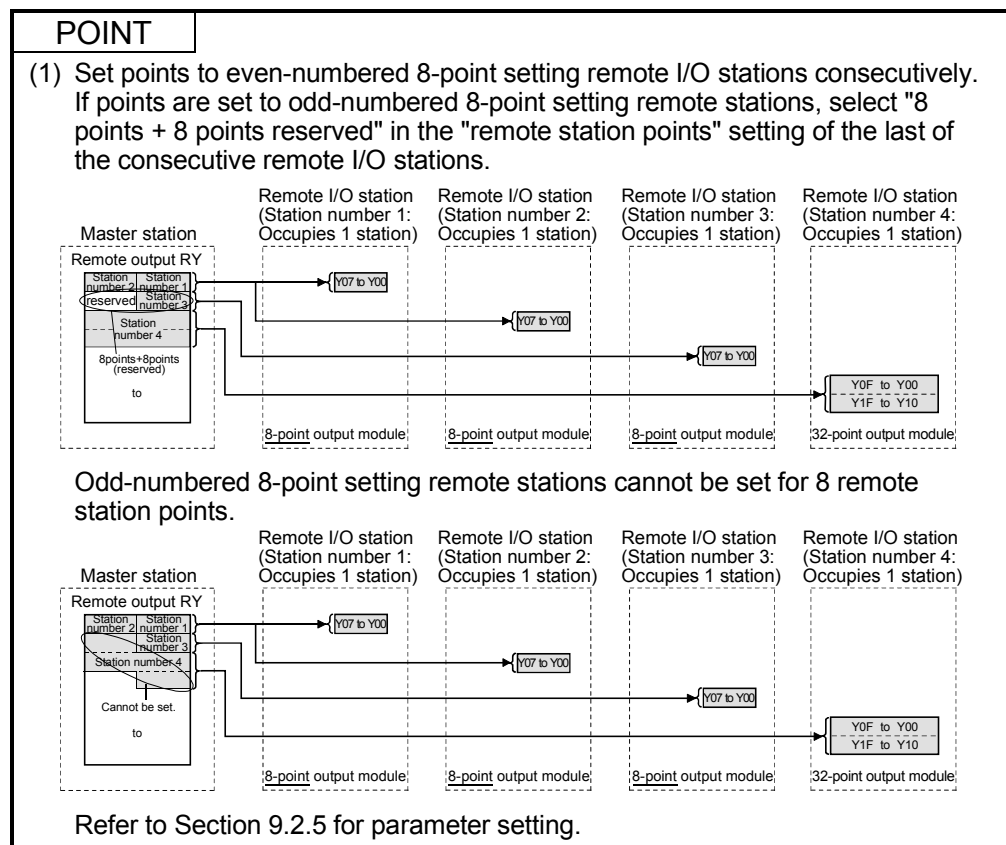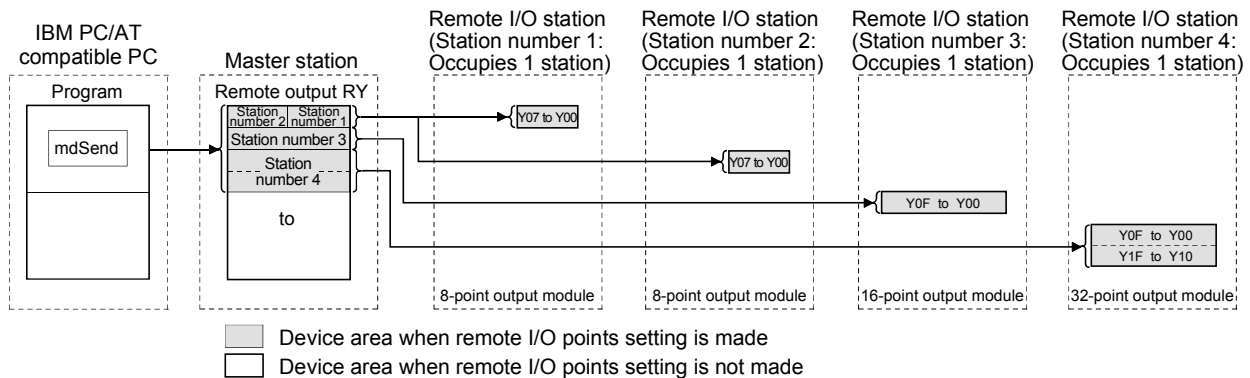
POINT

(1) Set points to even-numbered 8-point setting remote I/O stations consecutively. If points are set to odd-numbered 8-point setting remote stations, select "8 points + 8 points reserved" in the "remote station points" setting of the last of the consecutive remote I/O stations.

Odd-numbered 8-point setting remote stations cannot be set for 8 remote station points.

Refer to Section 9.2.5 for parameter setting.

[Setting method]

The setting is performed at <<Parameter settings>> in the CC-Link Ver.2 utility. Refer to Section 9.2.5 for setting details.

(1) Precautions for remote I/O station points setting
Set the points not less than I/O points of the actually installed remote I/O station with the parameter. Otherwise, the I/O operations corresponding to the exceeded points will not function normally.

4.4.7 Increasing the number of cyclic points (Remote net ver.2 mode, Remote net additional mode)

This function increases the number of cyclic points in the CC-Link system.

When increasing the number of cyclic points, select one from the following two modes.

• Remote net ver.2 mode .... Mode used for configuring a new system
• Remote net additional mode............ Mode used for incorporating an additional Ver.2 compatible slave station into the existing Ver.1 system

The number of cyclic points per station can be increased as indicated in the following table.

Table 4.7

		Expanded cyclic setting			
		single	double	quadruple	octuple
Occupies 1 station	Remote I/O (RX, RY)	32 points	32 points	64 points	128 points
	Remote register (RWw, RWr)	4 points	8 points	16 points	32 points
Occupies 2 stations	Remote I/O (RX, RY)	64 points	96 points	192 points	384 points
	Remote register (RWw, RWr)	8 points	16 points	32 points	64 points
Occupies 3 stations	Remote I/O (RX, RY)	96 points	160 points	320 points	640 points
	Remote register (RWw, RWr)	12 points	24 points	48 points	96 points
Occupies 4 stations	Remote I/O (RX, RY)	128 points	224 points	448 points	896 points
	Remote register (RWw, RWr)	16 points	32 points	64 points	128 points

REMARK

In the remote net ver.1 mode, the number of cyclic points cannot be increased.

(1)   Remote net ver.2 mode

This mode is designed to configure a new system.

The number of cyclic points can be increased as indicated below.

- Per station, Max. RX/RY: 128 points, RWw/RWr: 32 points
  (In the case of 1 station occupied with octuple setting)
- Per CC-Link system, Max. RX/RY:8192 points, RWw/RWr: 2048 points
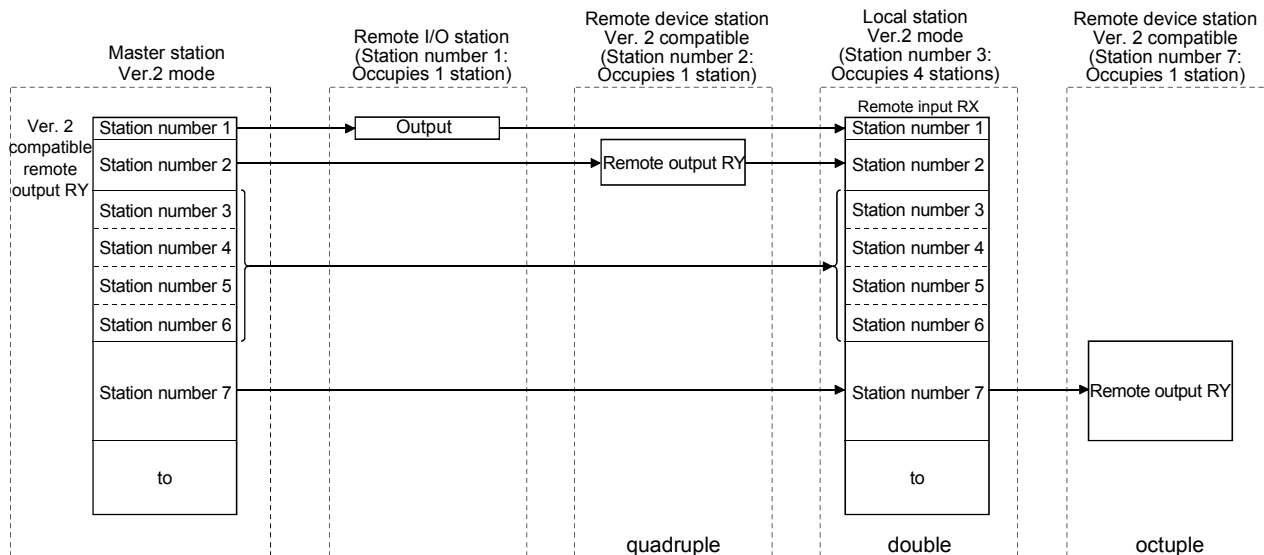
[Setting method]

The setting is performed at <<Parameter settings>> in the CC-Link Ver.2 utility. Refer to Section 9.2.5 for setting details.

POINT
(1) In the remote net ver.2 mode, 0 points can be set for a reserved station.
(2) In the remote net ver.2 mode, RWw and RWr of the remote I/O station are set to 0 points. Care must be taken to calculate the word points for the programmable controller CPU side.

(2) Remote net additional mode
This mode is designed to be used when a CC-Link Ver.2 compatible slave station is added to the existing CC-Link Ver.1 system.
The program of the existing system can be used as is.

```
┌─────────────────────────────────────────────────────────────────────────┐
│  ┌──────────┐                                                            │
│  │  POINT   │                                                            │
│  └──────────┘                                                            │
│  (1)  Set Ver.1 compatible slave stations to the smaller station numbers,│
│       and Ver.2 compatible slave stations to greater station numbers.    │
│       In the previous page example, the Ver.2 compatible slave stations  │
│       are added to after station No. 4 since the existing CC-Link Ver.1  │
│       system uses up to No. 3.                                           │
│  (2)  The remote net additional mode assumes that the Ver.2 compatible   │
│       slave stations are added to the existing CC-Link Ver.1 system.     │
│       When changing the station number of a Ver.2 compatible slave       │
│       station or adding a Ver.2 compatible slave station between stations,│
│       configure them in the remote net ver.2 mode.                       │
│  (3)  In the remote net additional mode, I/O station points setting and  │
│       reserved station 0-point setting are not available.                │
│  (4)  When there is a possibility of adding some Ver.1 compatible slave   │
│       stations in the future in the remote net additional mode, set       │
│       reserved stations after the Ver.1 compatible slave station settings │
│       to make the system extension easy.                                  │
│  (5)  The following operations are required to change the mode of the      │
│       CC-Link Ver.1 system including the standby master station to the    │
│       remote net additional mode.                                         │
│       • Changing the master station to a board or a module applicable to  │
│         Ver.2.                                                             │
│       • As a new standby master station, add a board or a module          │
│         applicable to Ver.2.                                              │
│       • Setting the new standby master station number to larger station   │
│         number than the slave station applicable to Ver.1.                │
│       • Changing the conventional standby master station to local station.│
│         (set at the parameter)                                            │
└─────────────────────────────────────────────────────────────────────────┘
```

(CC-Link system before change)

Master station No.0	Standby master station No.1	Remote I/O station No.2	Remote I/O station No.4
Ver.1 compatible	Ver.1 compatible	Ver.1 compatible	Ver.1 compatible
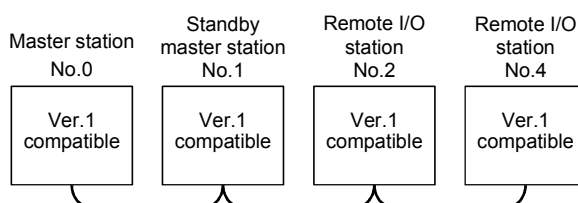
(CC-Link system after change: Remote net additional mode)
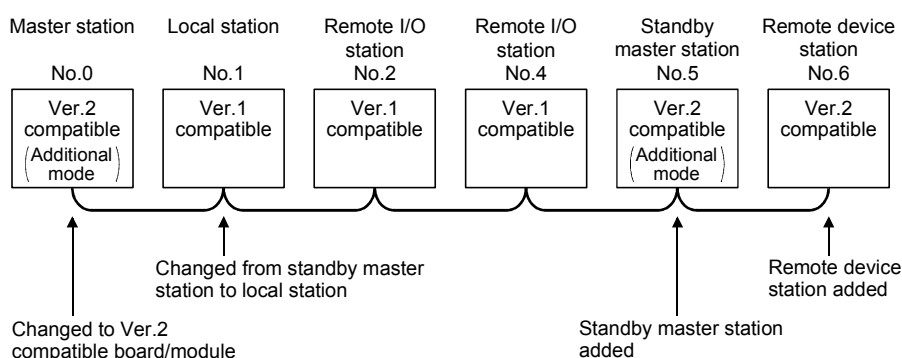
Master station No.0	Local station No.1	Remote I/O station No.2	Remote I/O station No.4	Standby master station No.5	Remote device station No.6
Ver.2 compatible (Additional mode)	Ver.1 compatible	Ver.1 compatible	Ver.1 compatible	Ver.2 compatible (Additional mode)	Ver.2 compatible

Changed to Ver.2 compatible board/module

Changed from standby master station to local station

Standby master station added

Remote device station added

[Setting method]

The setting is performed at <<Parameter settings>> in the CC-Link Ver.2 utility.
Refer to Section 9.2.5 for setting details.

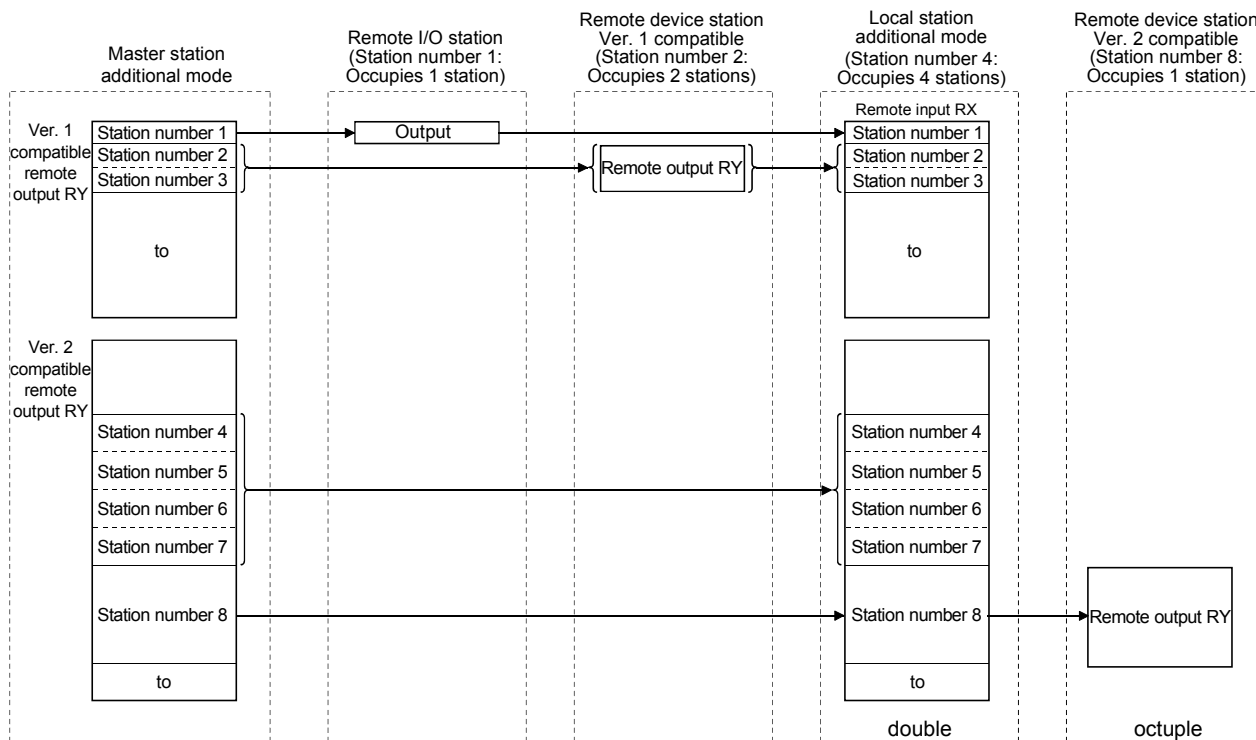### (3)   Precautions for cyclic points increase setting

(a)   Whether system can be configured or not

The following table indicates whether cyclic transmission can be made or not in each station.

Slave station / Master station	Q80BD-J61BT11N Q81BD-J61BT11 QJ61BT11N						A80BDE-J61BT11, A80BDE-J61BT13, QJ61BT11 *4, AJ61BT11, A1SJ61BT11, AJ61QBT11, A1SJ61QBT11		Intelligent device station		Remote station		
	Local station			Standby master station			Local station	Standby master station			Remote device station		Remote I/O station
	Ver.2 mode	Additional mode	Ver.1 mode	Ver.2 mode	Additional mode	Ver.1 mode	Ver.1 mode	Ver.1 mode	Ver.2 compatible	Ver.1 compatible	Ver.2 compatible	Ver.1 compatible	Ver.1 compatible
Q80BD-J61BT11N Q81BD-J61BT11 QJ61BT11N — Ver.2 mode	○	×	△*1	△*3	×	×	△*1	×	○	○	○	○	○
Additional mode	○*2	○	△*1	×	△*3	×	△*1	×	○	○	○	○	○
Ver.1 mode	×	×	○	×	×	△*3	○	△*3	×	○	×	○	○
A80BDE-J61BT11 QJ61BT11 *4 — Ver.1 mode	×	×	○	×	×	△*3	○	△*3	×	○	×	○	○

○: Cyclic transmission enabled, △: Cyclic transmission enabled on condition, ×: Cyclic transmission disabled

*1: When the master station is in the remote net ver.2 mode or remote net additional mode of the Q80BD-J61BT11N/Q81BD-J61BT11 and the local station is in the remote net ver.1 mode of the QJ61BT11N or is the QJ61BT11, the local station can communicate with the master station but cannot confirm the data of the ver.2 compatible station.
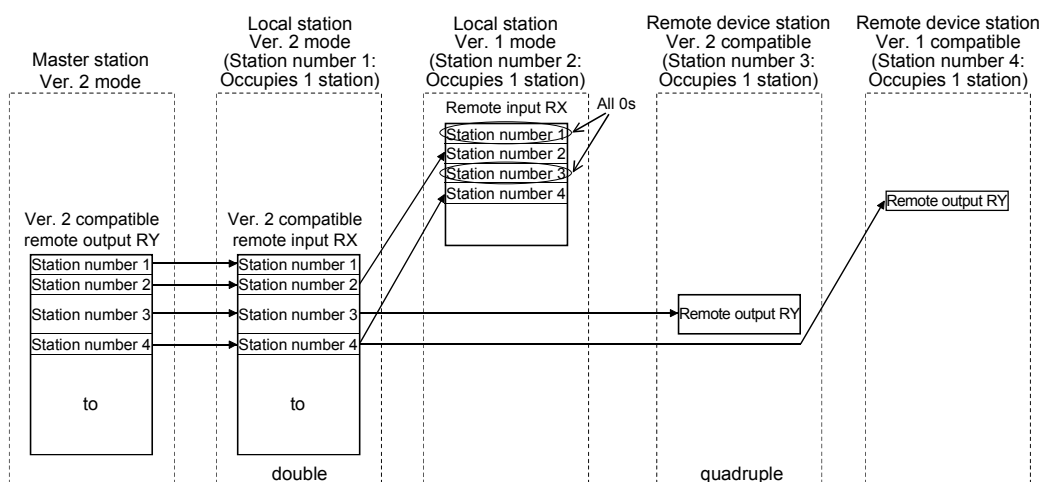
∗2: When the master station is the Q80BD-J61BT11N in the remote net
additional mode and the local station is the QJ61BT11N in the remote
net ver.2 mode, data in other stations can be checked as shown below.
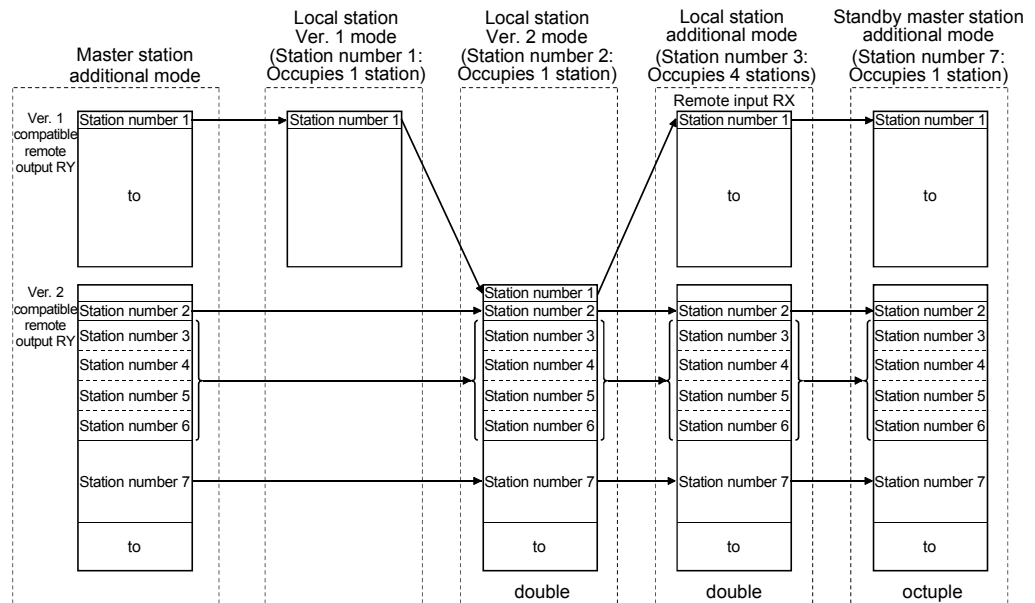
∗3: When the CC-Link Ver.1 board or the CC-Link Ver.2 board is set as
the standby master station, set the CC-Link Ver.1 board or the CC-
Link Ver.2 board respectively as the master station.
Refer to Section 2.2.2 (1) for combinations of the master station and
the standby master station.

∗4: The remote net ver.2 mode and remote net additional mode cannot be
used with the QJ61BT11.

(b) Whether send/receive is enabled or not

The following table indicates whether send/receive of cyclic data is enabled or not.

Send station			Receive station →	Q80BD-J61BT11N / Q81BD-J61BT11 / QJ61BT11N — Master station							
				Ver.2 mode		Additional mode		Ver.1 mode		Ver.2 mode	
				Ver.2 compatible area	Ver.1 compatible area	Ver.2 compatible area	Ver.1 compatible area	Ver.2 compatible area	Ver.1 compatible area	Ver.2 compatible area	Ver.1 compatible area
Q80BD-J61BT11N Q81BD-J61BT11 QJ61BT11N	Master station	Ver.2 mode	Ver.2 compatible area	—	—	—	—	—	—	○	—
			Ver.1 compatible area	—	—	—	—	—	—	—	—
		Additional mode	Ver.2 compatible area	—	—	—	—	—	—	○	—
			Ver.1 compatible area	—	—	—	—	—	—	○	—
		Ver.1 mode	Ver.2 compatible area	—	—	—	—	—	—	—	—
			Ver.1 compatible area	—	—	—	—	—	—	×	—
	Local station	Ver.2 mode	Ver.2 compatible area	○	—	○	×	—	×	○	—
			Ver.1 compatible area	—	—	—	—	—	—	—	—
		Additional mode	Ver.2 compatible area	—	—	○	×	—	—	○	—
			Ver.1 compatible area	—	—	—	—	—	—	—	—
		Ver.1 mode	Ver.2 compatible area	—	—	—	—	—	—	—	—
			Ver.1 compatible area	○	—	×	○	—	○	○	—
A80BDE-J61BT11 QJ61BT11	Master station	Ver.1 compatible		—	—	—	—	—	—	×	—
A80BDE-J61BT11 A80BDE-J61BT13 QJ61BT11	Local station	Ver.1 compatible		○	—	×	○	—	○	○	—
Intelligent device station		Ver.2 compatible		○	—	○	×	—	×	○	—
		Ver.1 compatible		○	—	×	○	—	○	○	—
Remote device station		Ver.2 compatible		○	—	○	×	—	×	○	—
		Ver.1 compatible		○	—	×	○	—	○	○	—
Remote I/O station		Ver.1 compatible		○	—	×	○	—	○	○	—

Q80BD-J61BT11N Q81BD-J61BT11 QJ61BT11N				A80BDE-J61BT11 QJ61BT11	A80BDE-J61BT11 A80BDE-J61BT13 QJ61BT11	Intelligent device station		Remote device station		Remote I/O station
Local station				Master station	Local station					
Additional mode		Ver1 mode		Ver.1 compatible	Ver.1 compatible	Ver.2 compatible	Ver.1 compatible	Ver.2 compatible	Ver.1 compatible	Ver.1 compatible
Ver.2 compatible area	Ver.1 compatible area	Ver.2 compatible area	Ver.1 compatible area							
—	—	—	○	—	○	○	○	○	○	○
—	—	—	—	—	—	—	—	—	—	—
○	×	—	—	—	×	○	×	○	×	×
×	○	—	○	—	○	×	○	×	○	○
—	—	—	—	—	—	—	—	—	—	—
—	—	—	○	—	○	—	○	—	○	○
○	—	—	×	×	×	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
○	×	—	×	×	×	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
×	○	—	○	○	○	—	—	—	—	—
×	×	—	○	—	○	×	○	×	○	○
×	○	—	○	○	○	—	—	—	—	—
○	×	—	×	×	×	—	—	—	—	—
×	○	—	○	○	○	—	—	—	—	—
○	×	—	×	×	×	—	—	—	—	—
×	○	—	○	○	○	—	—	—	—	—
×	○	—	○	○	○	—	—	—	—	—

○: Cyclic transmission enabled, ×: Cyclic transmission disabled, —:Prohibited

(4) Mismatch between parameter settings and points for the stations actually mounted

If the extended cyclic parameter setting on the master station is not consistent with the link points for each station that is actually connected, an error code is stored into SW0069 of the Q80BD-J61T11N at the master station. Also, consistency status of each station is stored into SW009C.

When an error code is stored into SW0069, reexamine the parameter settings.

(5) Precautions for modes between the master and local/standby master stations

At any of the following settings, an error (error code: B3A0) will occur at the local station/standby master station.

- The mode set at the master station differs from the mode set at the standby master station.
- When the master station is in the remote net ver.1 mode, the local station setting is the remote net ver.2 mode or remote net additional mode.
- When the master station is in the remote net ver.2 mode, the local station is in the remote net additional mode.

If an error has occurred, correct the mode parameter of the master station/local station/standby master station.

4.5 Transient Transmission Functions

The following explains the transient transmission functions.

4.5.1 Performing transient transmission (functions)

The following functions can be used for transient transmission.

Target station	Instruction	Description
Master station, local station, intelligent device station	mdReceive	Reads data from the buffer memory of the designated station or the programmable controller CPU device of the designated station.
	mdSend	Writes data to the buffer memory of the designated station or the programmable controller CPU device of the designated station.
Local station	mdRandR	Reads data from the randomly specified CPU device of the specified station.
	mdRandW	Writes data to the randomly designated CPU device of the designated station.
	mdDevSet	Sets the CPU device (bit device) of the designated device.
	mdDevRst	Resets the CPU device (bit device) of the designated device.

REMARK

Transient transmission is performed only when these functions are executed to other stations.

5 DATA LINK PROCESSING TIMES

This chapter explains the data link processing times such as the link scan time and transmission delay time.

5.1 Link Scan Time

This section shows the CC-Link scan time calculation method.

[Link scan time (LS)]

$$LS = BT \{29.4 + (NI \times 4.8) + (NW \times 9.6) + (N \times 32.4) + (ni \times 4.8) + (nw \times 9.6)\} + ST + F \ [\mu s]$$

BT: Constant (transmission rate)

Transmission rate	156 kbps	625 kbps	2.5 Mbps	5 Mbps	10 Mbps
BT	51.2	12.8	3.2	1.6	0.8

NI: The final station number among a, b and c
(This value includes the number of occupied stations but excludes reserved stations, and must be a multiple of 8.)
a: Total number of occupied stations for remote I/O stations
b: Total number of occupied stations for remote device stations
c: Total number of occupied stations for local stations, standby master station and intelligent device stations

NW: The final station number between b and c
(This value includes the number of occupied stations but excludes reserved stations, and must be a multiple of 8.)

Final station number	1 to 8	9 to 16	17 to 24	25 to 32	33 to 40	41 to 48	49 to 56	57 to 64
NI, NW	8	16	24	32	40	48	56	64

N: Number of connected stations (excluding reserved stations)
ni: a + b+ c (excluding reserved stations)
nw: b + c (excluding reserved stations)
ST: Constant
(Must be the largest value among 1) to 3) below. However, 2) is disregarded when b = 0 and 3) is disregarded when c = 0.)
1) $800 + (a \times 15)$
2) $900 + (b \times 50)$
3) When c < 26: $1200 + (c \times 100)$
When c > 26: $3700 + \{(c - 26) \times 25\}$

F: Return processing time {only when there is a faulty station (including error invalid and temporary error invalid stations)}
Number of faulty stations $\times 48 \times BT \times$ (retry count)

(Example) Using the following system configuration example when the
transmission rate is 10 Mbps (assuming that there is no faulty station
or transient transmission.)

*1: Occupies 1 station   *2: Occupies 2 stations   *3: Occupies 4 stations
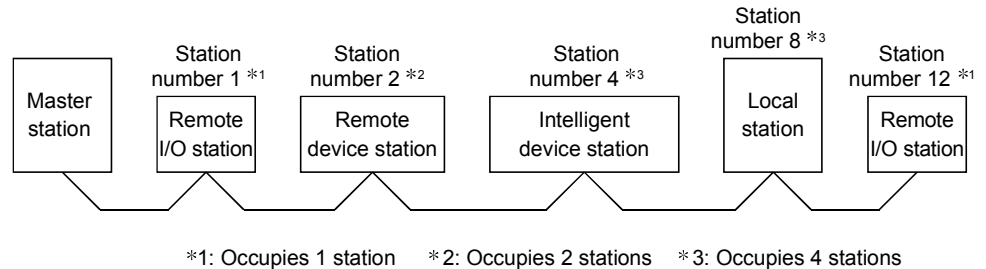
$BT = 0.8$ $ST = 2000$
$NI = 12 \rightarrow 16$ 1) $800 + (2 \times 15) = 830$
$NW = 11 \rightarrow 16$ 2) $900 + (2 \times 50) = 1000$
$N = 5$ 3) $1200 + (8 \times 100) = 2000$
$ni = 12$ $a = 2, b = 2, c = 8$
$nw = 10$

$$LS = 0.8 \{29.4 + (16 \times 4.8) + (16 \times 9.6) + (5 \times 32.4) + (12 \times 4.8) + (10 \times 9.6)\} + 2000$$
$$= 2556.2 \, [\mu s]$$
$$= 2.56 \, [ms]$$

5.2 Cyclic Transmission Processing Time

This section shows the transmission processing time taken when data of remote input (RX), remote output (RY) and remote register (RWw, RWr) are transferred by cyclic transmission.

When calculating the transmission delay time, the following processing time must be added to the cyclic transmission processing time shown in this section.
• The execution cycle time of reading/writing
• The own station access processing time by the md function (Refer to POINT.)

POINT

The own station access processing time by the md function differs according to the performance/loaded condition of the personal computer and the type of the CC-Link Ver.2 board.
The following table shows the example of the processing time of the personal computer. Use it as a guide.

1024 bytes own station access processing time

Personal computer CPU specification	Reading data from own station (mdReceive)		Writing data to own station (mdSend)	
	Q80BD-J61BT11N	Q81BD-J61BT11	Q80BD-J61BT11N	Q81BD-J61BT11
Pentium II (233MHz)	1.2ms	—	0.5ms	—
Pentium III (533MHz)	0.6ms	—	0.2ms	—
Pentium4 (3GHz)	0.3ms	—	0.1ms	—
PentiumD (2.8GHz)	0.35ms	0.65ms	0.1ms	0.1ms
Intel Core2Duo (1.86GHz)	0.3ms	0.6ms	0.1ms	0.1ms

5.2.1 Master station (CC-Link Ver.2 board) ↔ remote I/O station

(1) Master station (CC-Link Ver.2 board) (RX) ← Remote I/O station (input)

The following formula indicates the time taken from the moment a signal is input to the remote I/O station until RX of the master station (CC-Link Ver.2 board) turns on (off).

[Formula]

[Normal value]

LS × 1 + Remote I/O station response time [ms]   (✻1)

LS: Link scan time (refer to Section 5.1)

(Example) When the link scan time is 3 ms and the remote I/O station response time is 1.5 ms:

LS × 1 + Remote I/O station response time [ms]
= 3 × 1 + 1.5
= 4.5 [ms]

[Maximum value]

LS × 2 + Remote I/O station response time [ms]   (✻1)

LS: Link scan time (refer to Section 5.1)

(Example) When the link scan time is 3 ms and the remote I/O station response time is 1.5 ms:

LS × 2 + Remote I/O station response time [ms]
= 3 × 2 + 1.5
= 7.5 [ms]

✻1: When reading RX from the CC-Link board with the md function, it is necessary to add the own station access processing time of the md function.

(2)   Master station (CC-Link Ver.2 board) (RY) $\rightarrow$ Remote I/O station (output)

The following formula indicates the time taken from the moment RY of the master station (CC-Link Ver.2 board) turns on (off) until the remote I/O station output turns on (off).

[Formula]

[Normal value]

LS $\times$ 1 + Remote I/O station response time [ms]   (＊2)

LS: Link scan time (refer to Section 5.1)

(Example)   When the link scan time is 3 ms and the remote I/O station response time is 1.5 ms:

LS $\times$ 1 + Remote I/O station response time [ms]

= 3 $\times$ 1 + 1.5

= 4.5 [ms]

[Maximum value]

LS $\times$ 2 + Remote I/O station response time [ms]   (＊2)

LS: Link scan time (refer to Section 5.1)

(Example)   When the link scan time is 3 ms and the remote I/O station response time is 1.5 ms:

LS $\times$ 2 + Remote I/O station response time [ms]

= 3 $\times$ 2 + 1.5

= 7.5 [ms]

＊2: When writing RY to the CC-Link board with the md function, it is necessary to add the own station access processing time of the md function.

5.2.2 Master station (CC-Link Ver.2 board) ↔ remote device station (Ver.2 compatible slave station)

(1) Master station (CC-Link Ver.2 board) (RX) ← Remote device station (RX)

The following formula indicates the time taken from the moment a signal is input to the remote device station until RX of the master station (CC-Link Ver.2 board) turns on (off).

[Formula]

[Normal value]

$LS \times (1 \times (2 \times n - 1) + 1)$ + Remote device station processing time [ms]　　(∗1)

　　LS: Link scan time (refer to Section 5.1)

　　n:　Expanded cyclic setting (n time setup)

　　　　Note that n=1 is used for a Ver.1 compatible slave station.

(Example) When the link scan time is 3 ms and the expanded cyclic setting is "double" and the remote device station processing time is 1.5 ms:

$LS \times (1 \times (2 \times n - 1) + 1)$ + Remote device station processing time [ms]

　= $3 \times (1 \times (2 \times 2 - 1) + 1) + 1.5$

　= 13.5 [ms]

[Maximum value]

$LS \times (2 \times (2 \times n - 1) + 1)$ + Remote device station processing time [ms]　　(∗1)

　　LS: Link scan time (refer to Section 5.1)

　　n:　Expanded cyclic setting (n time setup)

　　　　Note that n=1 is used for a Ver.1 compatible slave station.

(Example) When the link scan time is 3 ms and the expanded cyclic setting is "double" and the remote device station processing time is 1.5 ms:

$LS \times (2 \times (2 \times n - 1) + 1)$ + Remote device station processing time [ms]

　= $3 \times (2 \times (2 \times 2 - 1) + 1) + 1.5$

　= 22.5 [ms]

∗1: When reading RX from the CC-Link board with the md function, it is necessary to add the own station access processing time of the md function.

POINT

The own station access processing time by the md function varies depending on the performance of the personal computer, load status and other factors. Refer to POINT in Section 5.2 for the processing time.

---

(2) Master station (CC-Link Ver.2 board) (RY) → Remote device
    station (RY)
    The following formula indicates the time taken from the moment RY of the master
    station (CC-Link Ver.2 board) turns on (off) until the remote device station output
    turns on (off).

[Formula]
[Normal value]
    LS $\times$ (1$\times$(2$\times$n-1)+1) + Remote device station processing time [ms]   ($*$2)
        LS: Link scan time (refer to Section 5.1)
        n: Expanded cyclic setting (n time setup)
            Note that n=1 is used for a Ver.1 compatible slave station.

    (Example) When the link scan time is 3 ms and the expanded cyclic setting is
               "double" and the remote device station processing time is 1.5 ms:
        LS $\times$ (1$\times$(2$\times$n-1)+1) + Remote device station processing time [ms]
            = 3 $\times$ (1$\times$(2$\times$2-1)+1) + 1.5
            = 13.5 [ms]

[Maximum value]
    LS $\times$ (2$\times$(2$\times$n-1)+1) + Remote device station processing time [ms]   ($*$2)
        LS: Link scan time (refer to Section 5.1)
        n: Expanded cyclic setting (n time setup)
            Note that n=1 is used for a Ver.1 compatible slave station.

    (Example) When the link scan time is 3 ms and the expanded cyclic setting is
               "double" and the remote device station processing time is 1.5 ms:
        LS $\times$ (2$\times$(2$\times$n-1)+1) + Remote device station processing time [ms]
            = 3 $\times$ (2$\times$(2$\times$2-1)+1) + 1.5
            = 22.5 [ms]

$*$2: When writing RY to the CC-Link board with the md function, it is necessary
     to add the own station access processing time of the md function.

(3) Master station (CC-Link Ver.2 board) (RWr) ← Remote device station (RWr)

The following formula indicates the time taken from the moment a signal is input to the remote device station until RWr of the master station (CC-Link Ver.2 board) is changed.

[Formula]

[Normal value]

LS $\times$ (1$\times$(2$\times$n-1)+1) + Remote device station processing time [ms]   (∗3)

LS: Link scan time (refer to Section 5.1)

n: Expanded cyclic setting (n time setup)

Note that n=1 is used for a Ver.1 compatible slave station.

(Example) When the link scan time is 3 ms and the expanded cyclic setting is "double" and the remote device station processing time is 1.5 ms:

LS $\times$ (1$\times$(2$\times$n-1)+1) + Remote device station processing time [ms]

= 3 $\times$ (1$\times$(2$\times$2-1)+1) + 1.5

= 13.5 [ms]

[Maximum value]

LS $\times$ (2$\times$(2$\times$n-1)+1) + Remote device station processing time [ms]   (∗3)

LS: Link scan time (refer to Section 5.1)

n: Expanded cyclic setting (n time setup)

Note that n=1 is used for a Ver.1 compatible slave station.

(Example) When the link scan time is 3 ms and the expanded cyclic setting is "double" and the remote device station processing time is 1.5 ms:

LS $\times$ (2$\times$(2$\times$n-1)+1) + Remote device station processing time [ms]

= 3 $\times$ (2$\times$(2$\times$2-1)+1) + 1.5

= 22.5 [ms]

∗3: When reading RWr from the CC-Link board with the md function, it is necessary to add the own station access processing time of the md function.

(4) Master station (CC-Link Ver.2 board) (RWw) → Remote device station (RWw)

The following formula indicates the time taken from the moment RWw of the master station (CC-Link Ver.2 board) is changed until the data of the remote device station is changed.

[Formula]

[Normal value]

LS × (1×(2×n-1)+1) + Remote device station processing time [ms]　　(∗4)

　　LS: Link scan time (refer to Section 5.1)

　　n: Expanded cyclic setting (n time setup)

　　Note that n=1 is used for a Ver.1 compatible slave station.

(Example)　When the link scan time is 3 ms and the expanded cyclic setting is "double" and the remote device station processing time is 1.5 ms:

LS × (1×(2×n-1)+1) + Remote device station processing time [ms]

= 3 × (1×(2×2-1)+1) + 1.5

= 13.5 [ms]

[Maximum value]

LS × (2×(2×n-1)+1) + Remote device station processing time [ms]　　(∗4)

　　LS: Link scan time (refer to Section 5.1)

　　n: Expanded cyclic setting (n time setup)

　　Note that n=1 is used for a Ver.1 compatible slave station.

(Example)　When the link scan time is 3 ms and the expanded cyclic setting is "double" and the remote device station processing time is 1.5 ms:

LS × (2×(2×n-1)+1) + Remote device station processing time [ms]

= 3 × (2×(2×2-1)+1) + 1.5

= 22.5 [ms]

∗4: When writing RWw to the CC-Link board with the md function, it is necessary to add the own station access processing time of the md function.

5.2.3 Master station (CC-Link Ver.2 board) ↔ local station (programmable controller) (Ver.2 compatible slave station)

(1) Master station (CC-Link Ver.2 board) (RX) ← Local station (programmable controller) (RY)

The following formula indicates the time taken from the moment a local station's CPU device turns on (off) until RX of the master station (CC-Link Ver.2 board) turns on (off).

[Formula]

[Normal value]

$LS \times (1 \times (2 \times n-1)+1) + SL$ [ms]　　　　　　(＊1)

LS: Link scan time (refer to Section 5.1)

SL: Local station sequence program scan time

n: Expanded cyclic setting (n time setup)

Note that n=1 is used for a Ver.1 compatible slave station.

(Example) When the link scan time is 3 ms and the expanded cyclic setting is "double" and the local station's sequence scan time is 10 ms:

$LS \times (1 \times (2 \times n-1)+1) + SL$ [ms]

$= 3 \times (1 \times (2 \times 2-1)+1) + 10$

$= 22$ [ms]

[Maximum value]

$LS \times (2 \times (2 \times n-1)+1) + SL$ [ms]　　　　　　(＊1)

LS: Link scan time (refer to Section 5.1)

SL: Local station sequence program scan time

n: Expanded cyclic setting (n time setup)

Note that n=1 is used for a Ver.1 compatible slave station.

(Example) When the link scan time is 3 ms and the expanded cyclic setting is "double" and the local station's sequence scan time is 10 ms:

$LS \times (2 \times (2 \times n-1)+1) + SL$ [ms]

$= 3 \times (2 \times (2 \times 2-1)+1) + 10$

$= 31$ [ms]

＊1: When reading RX from the CC-Link board with the md function, it is necessary to add the own station access processing time of the md function.

POINT
The own station access processing time by the md function varies depending on the performance of the personal computer, load status and other factors. Refer to POINT in Section 5.2 for the processing time.

(2)   Master station (CC-Link Ver.2 board) (RY) → Local station (programmable controller) (RX)

The following formula indicates the time taken from the moment RY of the master station (CC-Link Ver.2 board) turns on (off) until the local station's CPU device turns on (off).

[Formula]

[Normal value]

$LS \times (1 \times (2 \times n-1)+1) + SL$ [ms]   (＊2)

LS: Link scan time (refer to Section 5.1)

SL: Local station's sequence program scan time

n: Expanded cyclic setting (n time setup)
     Note that n=1 is used for a Ver.1 compatible slave station.

(Example) When the link scan time is 3 ms and the expanded cyclic setting is "double" and the local station's sequence scan time is 10 ms:

$LS \times (1 \times (2 \times n-1)+1) + SL$ [ms]

$= 3 \times (1 \times (2 \times 2-1)+1) + 10$

$= 22$ [ms]

[Maximum value]

$LS \times (2 \times (2 \times n-1)+1) + SL$ [ms]   (＊2)

LS: Link scan time (refer to Section 5.1)

SL: Local station's sequence program scan time

n: Expanded cyclic setting (n time setup)
     Note that n=1 is used for a Ver.1 compatible slave station.

(Example) When the link scan time is 3 ms and the expanded cyclic setting is "double" and the local station's sequence scan time is 10 ms:

$LS \times (2 \times (2 \times n-1)+1) + SL$ [ms]

$= 3 \times (2 \times (2 \times 2-1)+1) + 10$

$= 31$ [ms]

＊2: When writing RY to the CC-Link board with the md function, it is necessary to add the own station access processing time of the md function.

(3)   Master station (CC-Link Ver.2 board) (RWr) ← Local station
      (programmable controller) (RWw)
      The following formula indicates the time taken from the moment data is set in a
      local station's CPU device until RWr of the master station (CC-Link Ver.2 board)
      is changed.

[Formula]
[Normal value]
   $LS \times (1\times(2\times n-1)+1) + SL$ [ms]   (∗3)
               LS: Link scan time (refer to Section 5.1)
               SL: Local station's sequence program scan time
               n: Expanded cyclic setting (n time setup)
                   Note that n=1 is used for a Ver.1 compatible slave station.
   (Example) When the link scan time is 3 ms and the expanded cyclic setting is
               "double" and the local station's sequence scan time is 10 ms:
               $LS \times (1\times(2\times n-1)+1) + SL$ [ms]
               $= 3 \times (1\times(2\times 2-1)+1) + 10$
               $= 22$ [ms]
[Maximum value]
   $LS \times (2\times(2\times n-1)+1) + SL$ [ms]   (∗3)
               LS: Link scan time (refer to Section 5.1)
               SL: Local station's sequence program scan time
               n: Expanded cyclic setting (n time setup)
                   Note that n=1 is used for a Ver.1 compatible slave station.
   (Example) When the link scan time is 3 ms and the expanded cyclic setting is
               "double" and the local station's sequence scan time is 10 ms:
               $LS \times (2\times(2\times n-1)+1) + SL$ [ms]
               $= 3 \times (2\times(2\times 2-1)+1) + 10$
               $= 31$ [ms]

∗3: When reading RWr from the CC-Link board with the md function, it is
     necessary to add the own station access processing time of the md function.

(4)   Master station (CC-Link Ver.2 board) (RWw) $\rightarrow$ Local station (programmable controller) (RWr)

The following formula indicates the time taken from the moment RWw of the master station (CC-Link Ver.2 board) is changed until the data is stored in the local station's CPU device.

[Formula]

[Normal value]

LS $\times$ (1$\times$(2$\times$n-1)+1) + SL [ms]   ($\ast$4)

LS: Link scan time (refer to Section 5.1)

SL: Local station's sequence program scan time

n: Expanded cyclic setting (n time setup)

Note that n=1 is used for a Ver.1 compatible slave station.

(Example)   When the link scan time is 3 ms and the expanded cyclic setting is "double" and the local station's sequence scan time is 10 ms:

LS $\times$ (1$\times$(2$\times$n-1)+1) + SL [ms]

= 3 $\times$ (1$\times$(2$\times$2-1)+1) + 10

= 22 [ms]

[Maximum value]

LS $\times$ (2$\times$(2$\times$n-1)+1) + SL [ms]   ($\ast$4)

LS: Link scan time (refer to Section 5.1)

SL: Local station's sequence program scan time

n: Expanded cyclic setting (n time setup)

Note that n=1 is used for a Ver.1 compatible slave station.

(Example)   When the link scan time is 3 ms and the expanded cyclic setting is "double" and the local station's sequence scan time is 10 ms:

LS $\times$ (2$\times$(2$\times$n-1)+1) + SL [ms]

= 3 $\times$ (2$\times$(2$\times$2-1)+1) + 10

= 31 [ms]

$\ast$4: When writing RWw to the CC-Link board with the md function, it is necessary to add the own station access processing time of the md function.

5.2.4 Master station (CC-Link Ver.2 board) ↔ intelligent device station

The transmission delay time between the master station (CC-Link Ver.2 board) and the intelligent device station varies depending on the type of intelligent device station used. Refer to the User's Manual for the intelligent device module to be used.

Notes

(1) When reading RX and RWr from the CC-Link Ver.2 board with the md function, it is necessary to add the own station access processing time of the md function.

(2) When writing RY and RWw to the CC-Link Ver.2 board with the md function, it is necessary to add the own station access processing time of the md function.

POINT
The own station access processing time by the md function varies depending on the performance of the personal computer, load status and other factors. Refer to POINT in Section 5.2 for the processing time.

5.3 Transient Transmission Processing Time

This indicates the transient transmission processing time (the time required to execute an instruction and receive the processing result).

POINT
The own station access processing time by the md function varies depending on the performance of the personal computer, load status and other factors. The following shows an example of the processing time for a personal computer with Pentium II (233MHz). Own station access processing time (personal computer with Pentium II (233MHz))

Access size / md function	2 bytes	512 bytes	1024 bytes
Batch read (mdReceive)	0.3ms	0.7ms	1.2ms
Batch write (mdSend)	0.3ms	0.4ms	0.5ms

5.3.1 Master station (CC-Link Ver.2 board) ↔ local station (programmable controller)

(1) Master station (CC-Link Ver.2 board) → Local station (programmable controller)

The following formula indicates the time taken from instruction execution at the master station (CC-Link Ver.2 board) to receive processing result from the local station (programmable controller).

[Formula]
[Maximum value]
(a) Read

$LS \times [BC + \{($ Read points $+ 16)/16\}^{*1} \times 1.067] + SL$ [ms]

LS: Link scan time (Refer to Section 5.1.)
BC: Constant

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
BC	6	7	9	11	12

SL: Local station's sequence program scan time

＊1: Round up decimals.

(b) Write

OT + LS $\times$ [BC + {(Write points + 16)/72}^{*1} $\times$ 1.067] + SL [ms]

OT: Data transmission time between the personal computer and the CC-Link Ver.2 board.

The processing time varies depending on the performance of the personal computer, load status, and other factors. The following table shows an example of the processing time for a personal computer with a Pentium II (233MHz).

md function Access size	2 bytes	512 bytes	1024 bytes
Batch read (mdReceive)	0.4ms	0.8ms	1.3ms
Batch write (mdSend)	0.4ms	0.5ms	0.6ms

LS: Link scan time (Refer to Section 5.1.)

BC: Constant

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
BC	6	7	9	11	12

SL: Local station's sequence program scan time

$*1$: Round up decimals.

POINT

When performing a transient transmission using the md functions, the transient transmission is executed in several runs by dividing the number of request data into sizes inside the md functions that can be received by the opposite station. In addition, after the communication line is opened, the first md function performs extra transient transmission in order to obtain detailed information of the programmable controller.

5.3.2 Master station (CC-Link Ver.2 board) ↔ intelligent device station

(1) Master station (CC-Link Ver.2 board) → Intelligent device station
The following formula indicates the time taken from instruction execution at the master station (CC-Link Ver.2 board) to receive processing result from the intelligent device station.

[Formula]

[Maximum value]

(a) Read

OT + LS × [BC + {(Read points + 16)/16}^{*1} 1 × 1.067] [ms]

OT: Data transmission time between the personal computer and the CC-Link Ver.2 board
The processing time varies depending on the performance of the personal computer, load status, and other factors. The following table shows an example of the processing time for a personal computer with a Pentium II (233MHz).

md function　Access size	2 bytes	512 bytes	1024 bytes
Batch read (mdReceive)	0.4ms	0.8ms	1.3ms
Batch write (mdSend)	0.4ms	0.5ms	0.6ms

LS: Link scan time (Refer to Section 5.1.)

BC: Constant

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
BC	6	7	9	11	12

*1: Round up decimals.

(b) Write

OT + LS × [BC + {(Write points + 16)/72}^{*1} 1 × 1.13] [ms]

OT: Data transmission time between the personal computer and the CC-Link Ver.2 board
The processing time varies depending on the performance of the personal computer, load status, and other factors. The following table shows an example of the processing time for a personal computer with a Pentium II (233MHz).

md function　Access size	2 bytes	512 bytes	1024 bytes
Batch read (mdReceive)	0.4ms	0.8ms	1.3ms
Batch write (mdSend)	0.4ms	0.5ms	0.6ms

LS : Link scan time (Refer to Section 5.1.)

BC : Constant

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
BC	6	7	9	11	12

*1: Round up decimals.

POINT

When performing a transient transmission using the md functions, the transient transmission is executed in several runs by dividing the number of request data into sizes inside the md functions that can be received by the opposite station. In addition, after the communication line is opened, the first md function performs extra transient transmission in order to obtain detailed information of the programmable controller.

5.4 Station Status at Error

This section explains the status of each station at error.

5.4.1 Status of the master station and remote I/O station at error

Table 5.1 lists the status of the master station and remote I/O stations when an error occurs.

Table 5.1 Status of the master station and remote I/O station at error

Data link status				Master station				Remote I/O station	
				Remote input (RX)	Remote output (RY)	Remote register (RWw)	Remote register (RWr)	Input	Output
When the local station's programmable controller CPU is stopped (data link continues)				All points are set to off for only the receive area from the stopped local station ∗1	Continue	Continue	Continue	Continue	Continue
When data link for the entire system is stopped	Input data setting of the CC-Link Ver.2 utility at error	Master station	Clear	Clear	—	—	Latch	—	All points off
			Hold	Latch					
		Local station	Clear						
			Hold						
When a communication error (power off, etc.) occurs in a remote I/O station	Input data setting of the CC-Link Ver.2 utility at error	Master station	Clear	Clears the receive area from the remote I/O station having a communication error	Continue	Continue	Continue	—	All points off
			Hold	Retains the receive area from the remote I/O station having a communication error					
		Local station	Clear						
			Hold						
When a communication error (power off, etc.) occurs in a remote device station	Input data setting of the CC-Link Ver.2 utility at error	Master station	Clear	Clears the receive area from the remote device station having a communication error	Continue	Continue	Retains the receive area from the remote device station having a communication error	Continue	Continue
			Hold	Retains the receive area from the remote device station having a communication error					
		Local station	Clear						
			Hold						
When a communication error (power off, etc.) occurs in a local station	Input data setting of the CC-Link Ver.2 utility at error	Master station	Clear	Clears the receive area from the local station having a communication error	Continue	Continue	Retains the receive area from the local station having a communication error	Continue	Continue
			Hold	Retains the receive area from the local station having a communication error					
		Local station	Clear						
			Hold						

∗1: This is because Yn0 (refresh direction) is turned off.

5.4.2 Status of the remote device station, local station, standby master station and intelligent device station at error

Table 5.2 lists the status of the remote device station, local station, standby master station and intelligent device station at error.

Table 5.2 Status of the remote device station, local station, standby master station and intelligent device station at error

Data link status				Remote device station				Local station, standby master station, intelligent device station			
				Remote input (RX)	Remote output (RY)	Remote register (RWw)	Remote register (RWr)	Remote input (RX)	Remote output (RY)	Remote register (RWw)	Remote register (RWr)
When the local station's programmable controller CPU is stopped (data link continues)				Continue	Continue	Continue	Continue	Continue	Treats the own station send area with all 0's. ＊1 When stopped, all points of only the receive area from the local station are set to off.	Continue	Continue
When data link for the entire system is stopped	Input data setting of the CC-Link Ver.2 utility at error	Master station	Clear	—	All points off	—	—				
			Hold								
		Local station	Clear					Clear	Clears the receive areas from other stations	Retains the receive areas from other stations	Latch
			Hold					Latch	Retains the receive areas from other stations		
When a communication error (power off, etc.) occurs in a remote I/O station	Input data setting of the CC-Link Ver.2 utility at error	Master station	Clear	Continue	Continue	Continue	Continue				
			Hold								
		Local station	Clear					Continue	Clears the receive area from the remote I/O station having a communication error	Continue	Continue
			Hold						Retains the receive area from the remote I/O station having a communication error		
When a communication error (power off, etc.) occurs in a remote device station	Input data setting of the CC-Link Ver.2 utility at error	Master station	Clear	—	—	—	—				
			Hold								
		Local station	Clear					Continue	Clears the receive area from the remote device station having a communication error	Retains the receive area from the remote device station having a communication error	Continue
			Hold						Retains the receive area from the remote device station having a communication error		
When a communication error (power off, etc.) occurs in a local station	Input data setting of the CC-Link Ver.2 utility at error	Master station	Clear	Continue	Continue	Continue	Continue				
			Hold								
		Local station	Clear					Continue	Clears the receive area from the local station having a communication error	Retains the receive area from the local station having a communication error	Continue
			Hold						Retains the receive area from the local station having a communication error		

＊1: This is because Yn0 (refresh direction) is turned off.

6 PARAMETER SETTINGS

This chapter explains the parameter settings that are required to perform data link in the CC-Link system.

6.1 Parameter Setting Items

The parameter setting items and their descriptions are shown in Table 6.1.
Each parameter is set using the CC-Link Ver.2 Utility.
Refer to Appendix 9 Parameter Setting Sheet to record the set parameters.
For the CC-Link Ver.2 utility, refer to Section 9.2.

(1) Parameter setting items list
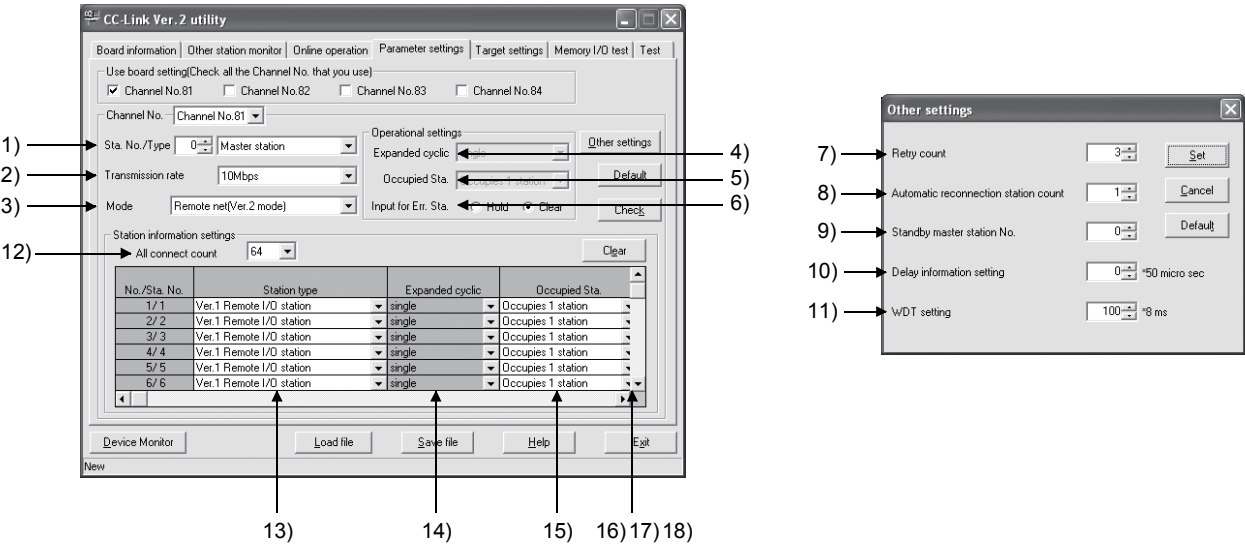Parameters to be set are listed on the next page (Table 6.1).

Table 6.1 Parameter setting items list

○: Setting required   ×: Setting not required

Setting item	Description	Master station	Local station Standby master station	Reference section
1) Sta. No./Type	Sets a station No. and a type of the own station. 　Setting range 　　Sta. No.: 0, 1 to 64 (Default: 1) 　　Type:　　When Sta. No. is 0:Master station, 　　　　　　When Sta. No. is 1 to 64: Local station 　　　　　　(Default), Standby master station	○	○	Section 4.3.4
2) Transmission rate	Set the transmission speed of the CC-Link Ver.2 board. 　Setting item:　　156kbps, 625kbps, 2.5Mbps, 5Mbps, 　　　　　　　　10Mbps (Default)	○	○	—
3) Mode	Set the operation mode of the own station. 　Setting item:　　Remote net ver.2 mode 　　　　　　　　Remote net additional mode 　　　　　　　　Remote net ver.1 mode (Default) 　　　　　　　　Offline	○	○	—
Operational settings				
4) Expanded cyclic	Make the expanded cyclic setting when increasing the number of cyclic points. (Can be set in remote net ver.2 mode or remote net additional mode) 　Setting item:　　single (Default), double, quadruple, 　　　　　　　　octuple	×	○	Section 4.4.7
5) Occupied Sta.	Set the occupied station count by the own station. 　Setting item:　　occupies 1 station (Default), occupies 　　　　　　　　2 stations, occupies 3 stations, 　　　　　　　　occupies 4 stations	×	○	—
6) Input for Err. Sta.	Set how to handle the input data in the event of a data link error. 　Setting item:　　Hold, Clear (Default)	○	○	—
Other settings				
7) Retry count	Set the number of retries to be performed when a communication error occurs. 　Setting range:　1 to 7 (Default: 3)	○	×	—
8) Automatic reconnection station count	Set the number of slave stations that can be returned to the network within 1 link scan. 　Setting range:　1 to 10 (Default: 1)	○	×	Section 4.3.2
9) Standby master station No.	Set the station number of the standby master station. *[1] 　Setting range:　0 to 64 (Default: 0)	○	×	Section 4.3.4
10) Delay information setting	Set 0 to "Delay information setting".	○	×	—
11) WDT setting	Set the watchdog timer monitoring time. (Unit: 8 ms) 　Setting range:　0 to 32767 (Default: 250)	○	○	—

*[1]: Refer to Section 4.3.4 for the standby master function.

6

O: Setting required   ×: Setting not required

Setting item		Description	Master station	Local station Standby master station	Reference section
Station information Settings					
12) All connect count		Set the number of slave stations connected to the master station. (Including reserved stations) Setting range: 1 to 64 (Default: 64)	O	×	—
Station information					
	13) Station type *1	Set the type of the relevant station. Setting range: Ver.1 remote I/O station (Default) Ver.1 remote device station Ver.1 intelligent device station Ver.2 remote device station Ver.2 intelligent device station	Refer to Table 6.2	×	—
	14) Expanded cyclic	Make the expanded cyclic setting of the relevant station. (Can be set in remote net ver.2 mode or remote net additional mode) Setting item: single (Default), double, quadruple, octuple		×	Section 4.4.7
	15) Occupied Sta.	Set the number of stations occupied by the relevant station. Setting item: occupies 1 station (Default), occupies 2 stations, occupies 3 stations, occupies 4 stations		×	—
	16) Remote station points	Set the points of the relevant station. Setting range: 0 points (Default), 8 points, 8 points+8 points, 16 points, 32 points		×	Section 4.4.6
	17) Reserve/ Invalid station select	Specify the reserved station or error invalid station. Setting range: No setting (Default), Reserved station, Invalid station		×	Section 4.4.1 Section 4.4.2
	18) Intelligent buffer select (word)	Assign the buffer memory size for transient transmission to the local station, the intelligent device station and the standby master station. Setting range (Per station) Send/receive buffer size: 0, 64 to 4096 (words) (Default: 64) Note that, when it is set to multiple stations, the total send/receive buffer size for all slave stations must be within 4096 (words). Automatic (automatic update) buffer size: 0, 64 to 4096 (words) (Default: 128) Note that, when it is set to multiple stations, the total automatic buffer size for all slave stations must be within 4096 (words).		×	—

*1: Select the intelligent device station when using the local station.

> **POINT**
>
> When changing parameters and/or settings of the master station or slave station, perform the operation after stopping the data link at the master station.

Table 6.2 Availability of station information setting (only when selecting the master station)

O: Setting required   ×: Setting not required

Mode setting / Setting item	Number of connected modules	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/ invalid station count	Intelligent buffer select (word)
Remote net ver.1 mode	O	No setting	×	O	×	O	×
	O	Remote I/O station	×	O	×	O	×
	O	Remote device station	×	O	×	O	×
	O	Intelligent device station	×	O	×	O	O
Remote net ver.2 mode	O	No setting	×	O	O [2]	O	×
	O	Ver.1 Remote I/O station	×	O	0 points (Reserved station) 8 points 8 points + 8 empty points 16 points 32 points	O	×
	O	Ver.1 Remote device station	×	O	O [2]	O	×
	O	Ver.1 Intelligent device station	×	O	O [2]	O	O
	O	Ver.2 Remote device station	O	O	O [2]	O	×
	O	Ver.2 Intelligent device station	O	O	O [2]	O	O
Remote net additional mode [1]	O	No setting	×	O	×	O	×
	O	Ver.1 Remote I/O station	×	O	×	O	×
	O	Ver.1 Remote device station	×	O	×	O	×
	O	Ver.1 Intelligent device station	×	O	×	O	O
	O	Ver.2 Remote device station	O	O	×	O	×
	O	Ver.2 Intelligent device station	O	O	×	O	O

[1]: Set smaller station numbers to the remote net ver.1 mode stations and larger station numbers to the remote net ver.2 mode stations.
    System configuration with remote net ver.1 mode stations only is available while system configuration with remote net ver.2 mode stations only is not allowed.
[2]: The following table shows the remote station points setting options available for the expanded cyclic setting and the occupied station count.

Table 6.3 Remote station points setting options

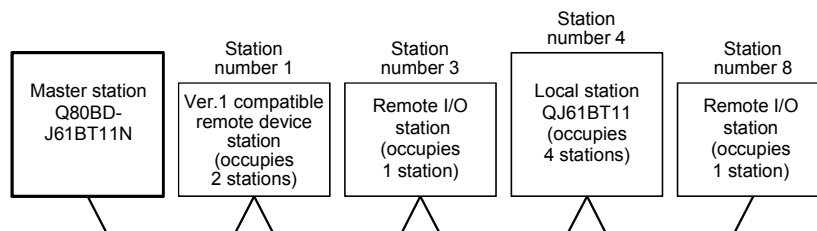| Station type	Expanded cyclic	Occupied station count				
		No setting	Occupies 1 station	Occupies 2 stations	Occupies 3 stations	Occupies 4 stations
No setting Ver.1 remote device Ver.1 intelligent device	Single (fixation)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)
		32 points	32 points	64 points	96 points	128 points
Ver.2 remote device Ver.2 intelligent device	Single	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)
		32 points	32 points	64 points	96 points	128 points
	Double	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)
		32 points	32 points	96 points	160 points	224 points
	Quadruple	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)
		64 points	64 points	192 points	320 points	448 points
	Octuple	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)	0 points (Reserved station)
		128 points	128 points	384 points	640 points	896 points

6.2 Parameter Setting Examples (Remote Net Ver.1 Mode)

This section explains the parameter settings using the CC-Link Ver.2 utility.

6.2.1 Master station network parameter settings

The descriptions in this section are based on the following system configuration example.
For details of the CC-Link Ver.2 utility, refer to Section 9.2.

Setting item			Setting value
Sta. No.			0
Type			Master station
Transmission rate			10 Mbps
Mode			Remote net [Ver.1 mode]
Operational settings	Expanded cyclic		single
	Occupied Sta.		Occupies 1 station
	Input for Err. Sta.		Clear
	Other settings	Retry count	3 (Times)
		Automatic reconnection station count	1 (Module)
		Standby master station No.	0 (no standby master station designated)
		Delay information setting	0 × 50 micro sec
		WDT setting	250 × 8 ms
Station information settings	All connect count		4 (Modules)
	Station information		Refer to the Table below.

Station information setting items

Setting item		Setting value			
No. / Sta. No.		1/1	2/3	3/4	4/8
Station type		Remote device station	Remote I/O station	Intelligent device station	Remote I/O station
Expanded cyclic		single	single	single	single
Occupied Sta.		Occupies 2 stations	Occupies 1 station	Occupies 4 stations	Occupies 1 station
Remote station points		64 points	32 points	128 points	32 points
Reserve/invalid station select		No setting	No setting	No setting	No setting
Intelligent buffer select (word)	Send	—	—	16	—
	Receive	—	—	—	—
	Automatic	—	—	—	—

▨ : Setting not required

6.2.2 Local station network parameter settings

The descriptions in this section are based on the following system configuration example.

For details of the CC-Link Ver.2 utility, refer to Section 9.2.
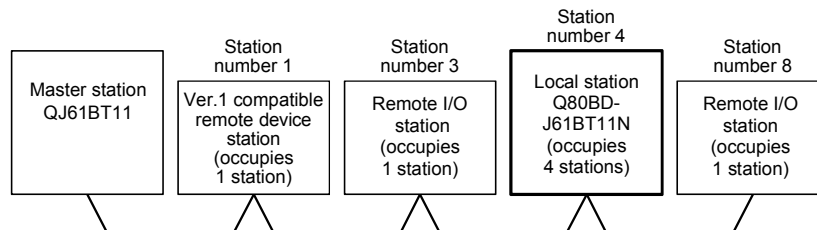
Setting item			Setting value
Sta. No.			0
Type			Local station
Transmission rate			10 Mbps
Mode			Remote net [Ver.1 mode]
Operational settings	Expanded cyclic		single
	Occupied Sta.		Occupies 4 stations
	Input for Err. Sta.		Clear
	Other settings	Retry count	—
		Automatic reconnection station count	—
		Standby master station No.	—
		Delay information setting	—
		WDT setting	250 × 8 ms
Station information settings	All connect count		—
	Station information		—

Station information setting items

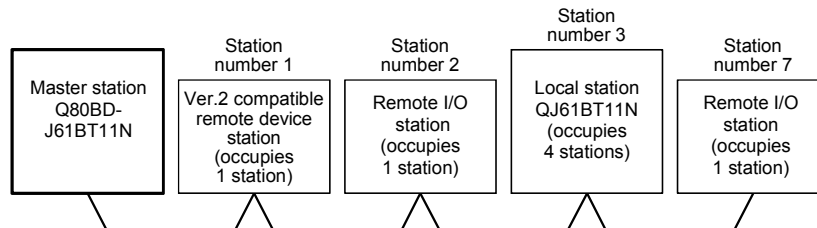| Setting item		Setting value			
No. / Sta. No.		—	—	—	—
Station type		—	—	—	—
Expanded cyclic		—	—	—	—
Occupied Sta.		—	—	—	—
Remote station points		—	—	—	—
Reserve/invalid station select		—	—	—	—
Intelligent buffer select (word)	Send	—	—	—	—
	Receive	—	—	—	—
	Automatic	—	—	—	—

     : Setting not required

6.3 Parameter Setting Examples (Remote Net Ver.2 Mode)

This section explains the parameter settings using the CC-Link Ver.2 utility.

6.3.1 Master station network parameter settings

The descriptions in this section are based on the following system configuration example.
For details of the CC-Link Ver.2 utility, refer to Section 9.2.

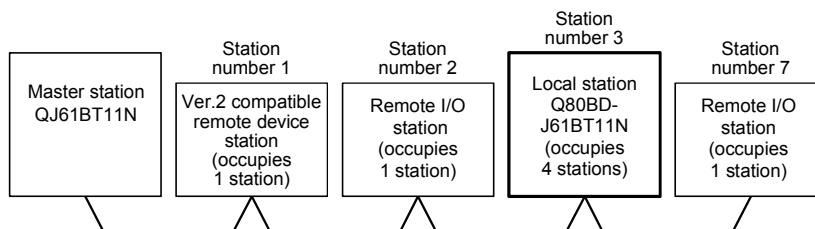| Setting item			Setting value
Sta. No.			0
Type			Master station
Transmission rate			10 Mbps
Mode			Remote net [Ver.2 mode]
Operational settings	Expanded cyclic		single
	Occupied Sta.		Occupies 1 station
	Input for Err. Sta.		Clear
	Other settings	Retry count	3 (Times)
		Automatic reconnection station count	1 (Module)
		Standby master station No.	0 (no standby master station designated)
		Delay information setting	0 × 50 micro sec
		WDT setting	250 × 8 ms
Station information settings	All connect count		4 (Modules)
	Station information		Refer to the Table below.

Station information setting items

Setting item		Setting value			
No. / Sta. No.		1/1	2/2	3/3	4/7
Station type		Ver.2 Remote device station	Ver.1 Remote I/O station	Ver.2 Intelligent device station	Ver.1 Remote I/O station
Expanded cyclic		octuple	single	double	single
Occupied Sta.		Occupies 1 station	Occupies 1 station	Occupies 4 stations	Occupies 1 station
Remote station points		128 points	32 points	224 points	32 points
Reserve/invalid station select		No setting	No setting	No setting	No setting
Intelligent buffer select (word)	Send	—	—	32	—
	Receive	—	—	—	—
	Automatic	—	—	—	—

☐ : Setting not required

6.3.2 Local station network parameter settings

The descriptions in this section are based on the following system configuration example.
For details of the CC-Link Ver.2 utility, refer to Section 9.2.

Setting item			Setting value
Sta. No.			3
Type			Local station
Transmission rate			10 Mbps
Mode			Remote net [Ver.2 mode]
Operational settings	Expanded cyclic		double
	Occupied Sta.		Occupies 4 stations
	Input for Err. Sta.		Clear
	Other settings	Retry count	—
		Automatic reconnection station count	—
		Standby master station No.	—
		Delay information setting	—
		WDT setting	250 × 8 ms
Station information settings	All connect count		—
	Station information		—

Station information setting items

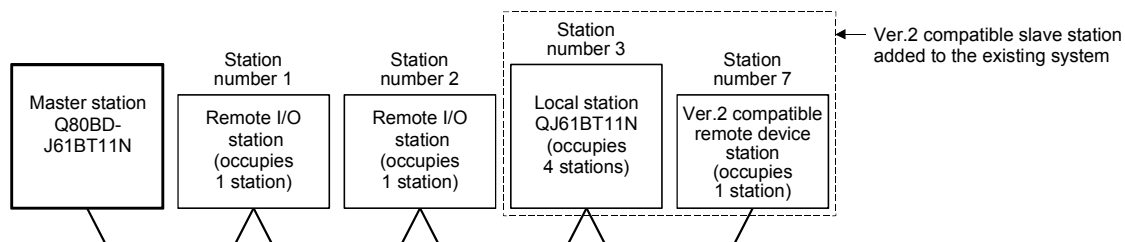| Setting item		Setting value			
No. / Sta. No.		—	—	—	—
Station type		—	—	—	—
Expanded cyclic		—	—	—	—
Occupied Sta.		—	—	—	—
Remote station points		—	—	—	—
Reserve/invalid station select		—	—	—	—
Intelligent buffer select (word)	Send	—	—	—	—
	Receive	—	—	—	—
	Automatic	—	—	—	—

☐ : Setting not required

6.4 Parameter Setting Examples (Remote Net Additional Mode)

This section explains the parameter settings using the CC-Link Ver.2 utility.

6.4.1 Master station network parameter settings

The descriptions in this section are based on the following system configuration example.
For details of the CC-Link Ver.2 utility, refer to Section 9.2.

Setting item			Setting value
Sta. No.			0
Type			Master station
Transmission rate			10 Mbps
Mode			Remote net [Additional mode]
Operational settings	Expanded cyclic		single
	Occupied Sta.		Occupies 1 station
	Input for Err. Sta.		Clear
	Other settings	Retry count	3 (Times)
		Automatic reconnection station count	1 (Module)
		Standby master station No.	0 (no standby master station designated)
		Delay information setting	0 × 50 micro sec
		WDT setting	250 × 8 ms
Station information settings	All connect count		4 (Modules)
	Station information		Refer to the Table below.

Station information setting items

Setting item		Setting value			
No. / Sta. No.		1/1	2/3	3/4	4/8
Station type		Ver.1 Remote I/O station	Ver.1 Remote I/O station	Ver.2 Intelligent device station	Ver.2 Remote device station
Expanded cyclic		single	single	double	octuple
Occupied Sta.		Occupies 1 station	Occupies 1 station	Occupies 4 stations	Occupies 1 station
Remote station points		32 points	32 points	224 points	128 points
Reserve/invalid station select		No setting	No setting	No setting	No setting
Intelligent buffer select (word)	Send	—	—	32	—
	Receive	—	—	—	—
	Automatic	—	—	—	—

[ ] : Setting not required

6.4.2 Local station network parameter settings

The descriptions in this section are based on the following system configuration example.
For details of the CC-Link Ver.2 utility, refer to Section 9.2.

Setting item			Setting value
Sta. No.			3
Type			Local station
Transmission rate			10 Mbps
Mode			Remote net [Additional mode]
Operational settings	Expanded cyclic		double
	Occupied Sta.		Occupies 4 stations
	Input for Err. Sta.		Clear
	Other settings	Retry count	—
		Automatic reconnection station count	—
		Standby master station No.	—
		Delay information setting	—
		WDT setting	250 × 8 ms
Station information settings	All connect count		—
	Station information		—

Station information setting items

Setting item		Setting value			
No. / Sta. No.		—	—	—	—
Station type		—	—	—	—
Expanded cyclic		—	—	—	—
Occupied Sta.		—	—	—	—
Remote station points		—	—	—	—
Reserve/invalid station select		—	—	—	—
Intelligent buffer select (word)	Send	—	—	—	—
	Receive	—	—	—	—
	Automatic	—	—	—	—

[gray box] : Setting not required

7 EMC AND LOW VOLTAGE DIRECTIVE

For the products sold in European countries, the conformance to the EMC Directive, which is one of the European Directives, has been a legal obligation since 1996. Also, conformance to the Low Voltage Directive, another European Directive, has been a legal obligation since 1997.
Manufacturers who recognize their products must conform to the EMC and Low Voltage Directives are required to declare that their products conform to these Directives and put a "CE mark" on their products.

(1) Authorized representative in Europe

Authorized representative in Europe is shown below.
Name : Mitsubishi Electric Europe BV
Address: Gothaer strase 8, 40880 Ratingen, Germany

7.1 Requirements for Conformance to EMC Directive

The EMC Directive specifies that products placed on the market must "be so constructed that they do not cause excessive electromagnetic interference (emissions) and are not unduly affected by electromagnetic interference (immunity)". The applicable products are requested to meet these requirements. The sections 7.1.1 through 7.1.4 summarize the precautions on conformance to the EMC Directive of the machinery constructed using the CC-Link Ver.2 Board.
The details of these precautions has been prepared based on the control requirements and the applicable standards. However, we will not assure that the overall machinery manufactured according to these details conforms to the above-mentioned directives. The final decision on the method for the EMC Directive conformance and the application must be made by the manufacturer of the machinery.

7

7.1.1 Standards applicable to the EMC Directive

The standards applicable to the EMC Directive are listed below.
All test items were tested by installing each device on a personal computer bearing a
CE certification logo.

Specification	Test item	Test details	Standard value
EN50081-2: 1995	EN55011 Radiated noise	Electromagnetic emissions from the product are measured.	30M-230MHz QP: 　30dB μ V/m (30 m in measurement range) ＊1 230M-1000MHz QP: 　37 dB μ V/m (30 m in measurement range)
	EN55011 Conducted noise	Electromagnetic emissions from the product to the power line is measured.	150k-500kHz QP: 79 dB, Mean: 66 dB ＊1 500k-30MHz QP: 73 dB, Mean: 60 dB
EN61131-2: 1996	EN61000-4-2 Electrostatic immunity	Immunity test in which static electricity is applied to the cabinet of the equipment.	15kV Aerial discharge
	EN61000-4-4 Fast transient burst noise	Immunity test in which burst noise is applied to the power line and signal lines.	Power line: 2kV Digital I/O (24V or higher): 1kV 　(Digital I/O (24V or less)) > 250V 　(Analog I/O, signal lines) > 250V
	EN61000-4-3 Radiated field AM modulation	Immunity test in which field is irradiated to the product.	10V/m, 26-1000MHz, 80%AM modulation@1kHz
	EN61000-4-12 Damped oscillatory wave immunity	Immunity test in which a damped oscillatory wave is superimposed on the power line.	Power line: 1kV Digital I/O (24V or higher): 1kV

＊1: QP: Quasi-peak value, Mean: Mean value

7

7.1.2 Installing devices in the control panel

Installing devices in the control panel has a considerable effect, not only securing safety but also shielding the noise generated from the personal computer in the control panel. ＊

＊： Also, each network remote station needs to be installed inside the control panel. However, the waterproof type remote station can be installed outside the control panel.

(1) Control panel

(a) Use a conductive control panel.

(b) When attaching the control panel's top plate or base plate, mask painting and weld so that good surface contact can be made between the panel and plate.

(c) To ensure good electrical contact with the control panel, mask the paint on the installation bolts of the inner plate in the control panel so that contact between surfaces can be ensured over the widest possible area.

(d) Ground the control panel with a thick wire so that a low impedance connection to ground can be ensured even at high frequencies.

(e) Holes made in the control panel must be 10 cm (3.94 in.) diameter or less. If the holes are 10 cm (3.94 in.) or larger, radio frequency noise may be emitted.
In addition, because radio waves leak through a clearance between the control panel door and the main unit, reduce the clearance as much as practicable. The leakage of radio waves can be suppressed by the direct application of an EMI gasket on the paint surface.

Maker name	Series type
KITAGAWA INDUSTRIES CO., LTD.	US series
ZIPPERTUBING (JAPAN) LTD.	71TS series
SEIWA ELECTRIC MFG CO., LTD.	E02S□□□A

Our tests have been carried out on a panel having the damping characteristics of 37 dB max. and 30 dB mean (measured by 3 m method with 30 to 300MHz).

(2) Connection of power and ground cable

The power supply cable and ground cable for a personal computer should be laid out as follows:

(a) Provide a grounding point near the power supply of personal computer. Ground the FG (frame ground) terminal of the personal computer and the SLD (shield) terminal of the CC-Link Ver.2 board with the thickest and shortest grounding wire (wire for grounding) possible (about 30 cm (11.81 in.) or less in length). Since the FG and SLD terminals function to ground the noise generated in the personal computer, it is necessary to ensure the lowest possible impedance.
As the wires are used to relieve the noise, the wire itself contains a large amount of noise and thus short wiring prevents from functioning as an antenna.

(b) Twist the ground cable leading to the ground point with the power supply cable. By twisting it with the ground cable, the noise leaking from the power supply cable may be grounded at a higher rate. However, twisting the power supply cable with the ground cable may not be necessary if a noise filter is installed on the power supply cable.

7.1.3 Cables

The cables extracted from the control panel contain a high frequency noise component.
On the outside of the control panel, therefore, they serve as antennas to emit noise.
Use shielded cable for the to be extracted to the outside of the control panel.
The use of a shielded cable also increases noise resistance.

(1) Grounding of shielded of shield cable

   (a) Ground the shield of the shield cable as near the exit as possible from the control panel.
If the ground point is not near the outlet, the cables after the ground point will cause electromagnetic induction, and will generate a higher harmonic noise.

    (b) Peel part of the shielded cable's sheath, and ground a wide section of the exposed shielded section against the control panel.
Clamp fittings can be used as shown below. Note that the painting on the inner side of the control panel, against which the clamp fitting is contacted, must be masked.
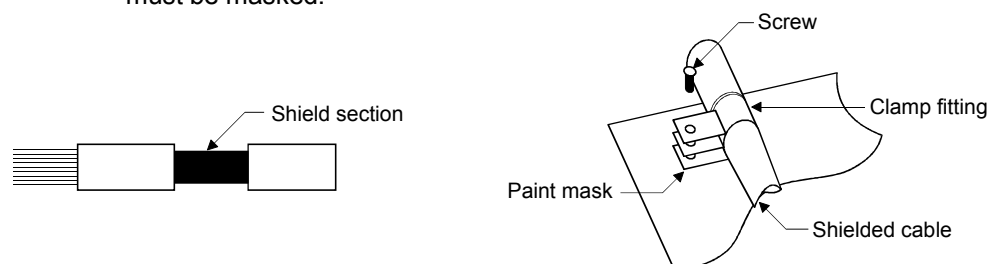
Note) The method of grounding by soldering a wire onto the shield section of the shielded cable as shown below is not recommended. The high frequency impedance will increase and the shield will be ineffective.
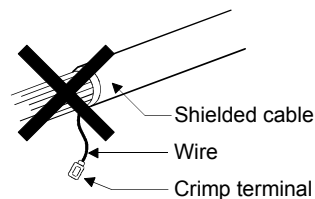
(2) Grounding procedure for the CC-Link dedicated cable

(a) Always ground the CC-Link dedicated cable connected to the CC-Link system master station, local station and remote station.
Since the CC-Link dedicated cable is a shielded cable, remove a part of the outer sheath. Then ground the exposed part of the shield indicated in the figure below using as wide a surface area as possible.
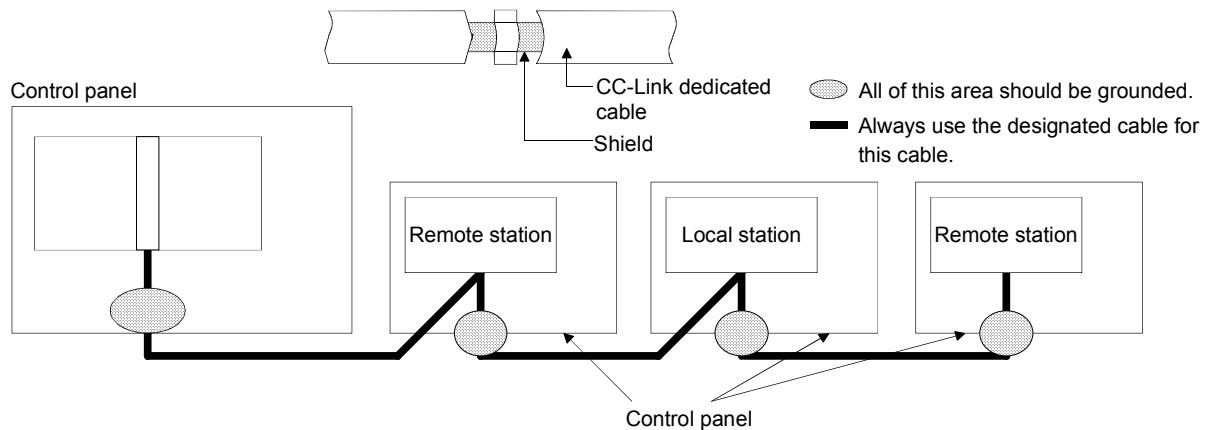
Furthermore, the grounding should be made within 30 cm (11.81 in.) of the CC-Link Ver.2 board terminal area and at the position closest to the exit of the control panel.

(b) Always use the specified CC-Link dedicated cable.

(c) Do not use a ferrite core for the CC-Link dedicated cable coming from each module and the CC-Link Ver.2 board.

(d) Ground the SLD terminal of the CC-Link Ver.2 board.
Ground the FG terminal of each module.

y
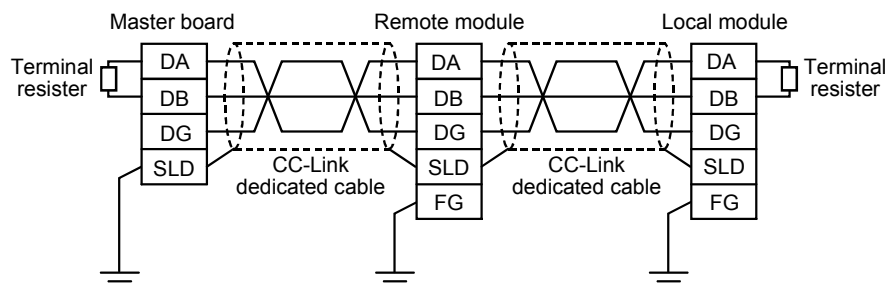
## 7.1.4 Noise filter (power supply line filter)

A noise filter is a component which has an effect on conducted noise.
It is not required to fit the noise filter to the power supply line, but fitting it can further suppress noise. (The noise filter has the effect of reducing conducted noise of 10MHz or less.) The precautions required when installing a noise filter are described below.

(1) Do not bundle the wires on the input side and output side of the noise filter. When they are bundled, the output side noise will induct into the input side wires.
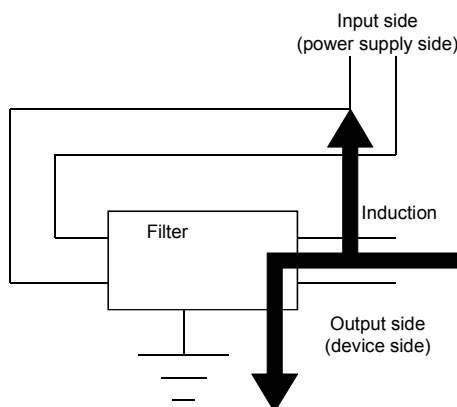
(a) The noise will induct into input side when the input and output wires are bundled.
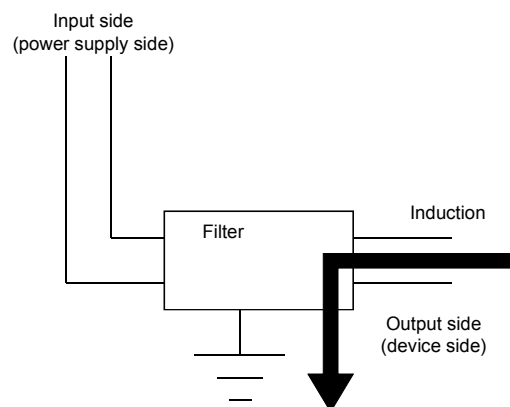
(b) Separate the input and output wires.

(2) Ground the ground terminal of the noise filter to the control panel using as short wiring as possible (about 10 cm (3.94 in.)).

REMARK

Reference noise filters are shown below.

Noise filter type	Maker name	Rated current(A)	Rated voltage(V)
FN343-3/01	SCHAFFNER	3	250
FN660-6-06		6	
ZHC2203-11	TDK	3	

7.2 Requirements for Conformance to Low Voltage Directive
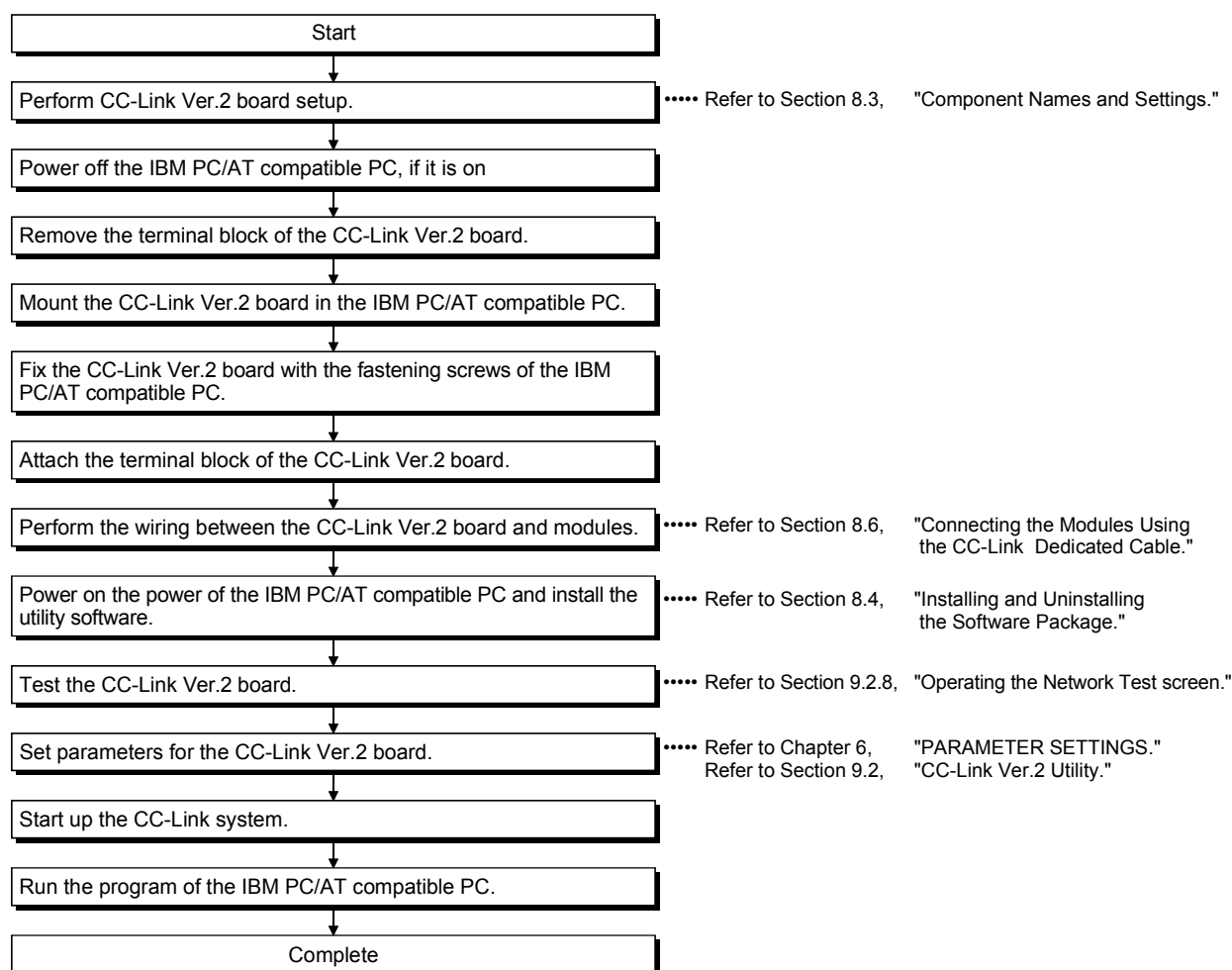
The CC-Link Ver.2 board is out of the requirement for conformance to the Low Voltage Directive, since it does not use the power supply in the range of 50 to 1000V AC and 75 to 1500V DC.

8 PROCEDURE BEFORE STARTING THE DATA LINK

This chapter explains the operating procedures required before starting the CC-Link Ver.2 board operation as well as the names and settings of the CC-Link Ver.2 board components, the wiring method, and how to perform hardware tests.

8.1 Procedures Before Operating the CC-Link Ver.2 Board

The following flowchart explains the procedures before operating the CC-Link Ver.2 board.

Start	
Perform CC-Link Ver.2 board setup.	••••• Refer to Section 8.3, "Component Names and Settings."
Power off the IBM PC/AT compatible PC, if it is on	
Remove the terminal block of the CC-Link Ver.2 board.	
Mount the CC-Link Ver.2 board in the IBM PC/AT compatible PC.	
Fix the CC-Link Ver.2 board with the fastening screws of the IBM PC/AT compatible PC.	
Attach the terminal block of the CC-Link Ver.2 board.	
Perform the wiring between the CC-Link Ver.2 board and modules.	••••• Refer to Section 8.6, "Connecting the Modules Using the CC-Link Dedicated Cable."
Power on the power of the IBM PC/AT compatible PC and install the utility software.	••••• Refer to Section 8.4, "Installing and Uninstalling the Software Package."
Test the CC-Link Ver.2 board.	••••• Refer to Section 9.2.8, "Operating the Network Test screen."
Set parameters for the CC-Link Ver.2 board.	••••• Refer to Chapter 6, "PARAMETER SETTINGS." Refer to Section 9.2, "CC-Link Ver.2 Utility."
Start up the CC-Link system.	
Run the program of the IBM PC/AT compatible PC.	
Complete	

CAUTION

When using the CC-Link Ver.2 board as a local board, the setting on the master station side is required to operate the CC-Link system.
For the master station setting, refer to the user's manual of the board/module which is used as the master station.

8

8.2 Installation

This section explains the handling precautions and installation environment of the CC-Link Ver.2 board.

8.2.1 Precautions on handling the CC-Link Ver.2 board

The following explains the handling precautions of the CC-Link Ver.2 board:

⚠ CAUTION	• Do not directly touch the conductive area or electronic components of the board. Doing so may cause malfunction or failure in the board. • Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the board. Failure to do so may cause a failure or malfunctions of the board. • While handling the board, be sure to keep it free of static electricity. Static electric charges may damage the board or result in malfunction. • Be careful not to let foreign objects such as swarf or wire chips get inside the personal computer. They may cause fires, failure or malfunction. • Be sure to turn off the power supply to the applicable station before installing or removing the terminal block. If the terminal block is installed or removed without turning off the power supply to the applicable station, correct data transmission cannot be guaranteed. • Do not drop the board and the terminal block or subject it to any excessive shock. It may damage the board and the terminal block or result in malfunction. • Be sure to shut off all phases of the external power supply used by the system before performing work such as installing the board and wiring. If all power is not turned off, there is a risk of electric shock or damage to the product. • Solderless terminals with insulation sleeve cannot be used for the terminal block. It is recommended that the wiring connecting sections of the solderless terminals will be covered with a marking tube or an insulation tube. • Use applicable solderless terminals and tighten them with the specified torque. If any solderless spade terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure. • Be sure to tighten any unused terminal screws within a tightening torque range (0.59 to 0.88N·m). Failure to do so may cause a short circuit due to contact with a solderless Terminal. • Always make sure to power off the system in advance when removing the terminating resistor to charge the system. If the terminating resistor is removed and mounted while the system is energized, normal data transmission will not be guaranteed. • Do not disassemble or modify board. Doing so could cause failure, malfunction, injury or fire. • When disposing of this product, treat it as industrial waste.

8

(1) Tighten the terminal block mounting screws and terminal block terminal screws of the CC-Link Ver.2 board using a torque within the following ranges.

Screw location	Clamping torque range
Terminal block terminal screws (M3.5 screws)	59 to 88 N·cm
Terminal block mounting screws (M3.5 screws)	59 to 88 N·cm

(2) Refer to the instruction manual provided with the personal computer for the clamping torque of the CC-Link Ver.2 board mounting screws.

(3) As a countermeasure to power surge due to lightening, connect a surge absorber for lightening as shown below.

←Surge absorber for lightening
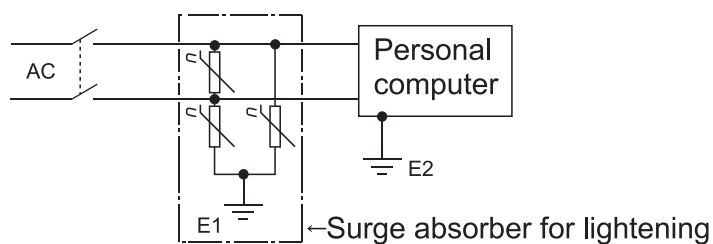
POINT
(1) Separate the ground of the surge absorber for lightening (E1) from that of the personal computer (E2).
(2) Select a surge absorber for lightening whose power supply voltage does no exceed the maximum allowable circuit voltage even at the time of maximum power supply voltage elevation.

8.2.2 Installation environment

Refer to the instruction manual provided with the personal computer for information on how to install the personal computer in which the CC-Link Ver.2 board has been mounted.

⚠ CAUTION	• Always ground the SLD terminal of the board and the personal computer to the protective ground conductor. Not doing so can cause a malfunction.

8.2.3 Mounting and removing the terminal block

Since a 2-piece type terminal block is used, the CC-Link Ver.2 board can be replaced without disconnecting the signal line to the terminal block.
The following shows how to mount and remove the terminal block:

Screwdriver

Remove the two screws on both ends of the terminal block and pull the terminal block out.
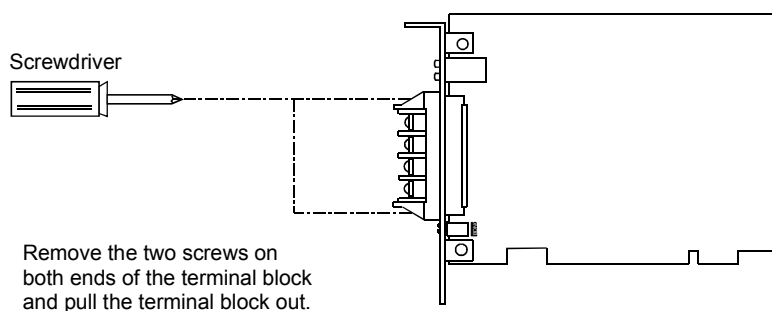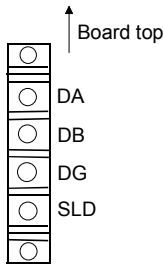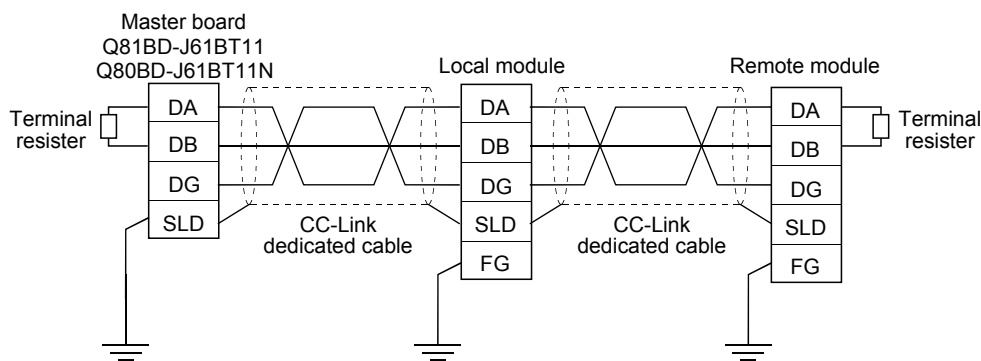
8.3 Component Names and Settings

This section explains the component names and settings of the CC-Link Ver.2 board.

No.	Name	Description
1)	Operation indicator LED RUN ERR. ○ ○ ○ ○ SD RD	Shows the CC-Link Ver.2 board status or communication status. There are two different kinds of LED indications for normal and error. (1) Normal status When the RUN LED is OFF or ON, the LED display becomes as shown in the table at the right. When a communication error has occurred in the normal status, identify the error on the "Board detail information" screen of the CC-Link Ver.2 utility. Refer to Section 9.2.2 "Operating the Information screen" for the "Board detail information" screen. (2) Error status When the RUN LED is flashing, the LED display becomes as shown in the table at the right. When an error has occurred in the error status, check the error description in event viewer. For details, refer to Section 17.1.4.

(1) Normal status table:

LED name	Status	Details
RUN	OFF	A WDT error has occurred, or the board is being reset.
	ON	Operating normally.
ERR.	OFF	No communication error has occurred, or the board is being reset.
	ON	All stations are faulty.
	Flicker	There is a faulty station or station No. is duplicated.
SD	OFF	No data have been transmitted, or the board is being reset.
	ON	Data are being transmitted.
RD	OFF	No data have been received, or the board is being reset.
	ON	Data are being received.

(2) Error status table:

LED name	Status	Details
RUN	Flicker	Indicates the board is in the error status.
	ON OFF	Indicates the display format is in normal status. Refer to (1).
ERR.	OFF	No OS start error has occurred.
	ON	An OS start error has occurred.
SD	OFF	No driver response error has occurred.
	ON	A driver response error has occurred.
RD	OFF	No PCI bus error has occurred.
	ON	A PCI bus error has occurred.

No.	Name	Description
2)	Terminal block for data link	Connects CC-Link dedicated cables for data link. (2-piece terminal block)
3)	Channel No. setting switch	Sets the board No. corresponding to the channel No. used for accessing the CC-Link Ver.2 board from the user program. Set unique board Nos. when installing more than one CC-Link Ver.2 board.

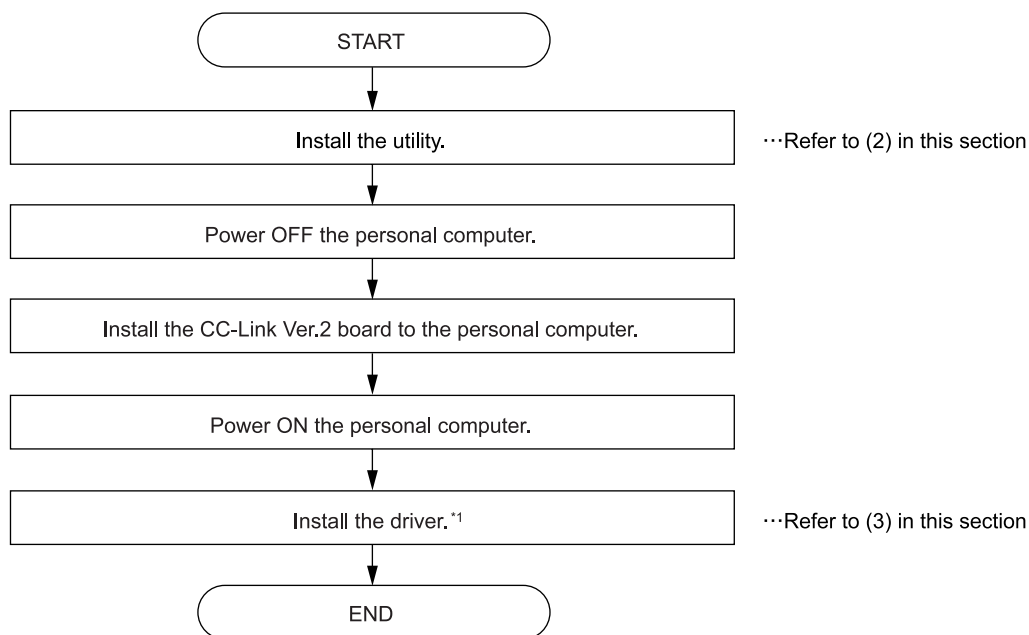| Switch		Channel No.	Board No.	Remarks
1	2			
OFF	OFF	81	0	Default setting
ON	OFF	82	1	—
OFF	ON	83	2	—
ON	ON	84	3	—

8.4 Installing and Uninstalling the Software Package

This section explains how to install and uninstall the software package.

8.4.1 Installation

This section explains a procedure for installing the software packages.

(1) **Overview of installation procedure**

```
              ┌─────────────────────────┐
              │          START          │
              └─────────────────────────┘
                           │
                           ▼
        ┌────────────────────────────────────┐
        │          Install the utility.      │   ···Refer to (2) in this section
        └────────────────────────────────────┘
                           │
                           ▼
        ┌────────────────────────────────────┐
        │      Power OFF the personal computer.│
        └────────────────────────────────────┘
                           │
                           ▼
        ┌────────────────────────────────────────────────────┐
        │  Install the CC-Link Ver.2 board to the personal computer. │
        └────────────────────────────────────────────────────┘
                           │
                           ▼
        ┌────────────────────────────────────┐
        │       Power ON the personal computer.│
        └────────────────────────────────────┘
                           │
                           ▼
        ┌────────────────────────────────────┐
        │        Install the driver.*1        │   ···Refer to (3) in this section
        └────────────────────────────────────┘
                           │
                           ▼
              ┌─────────────────────────┐
              │           END           │
              └─────────────────────────┘
```

＊1: When using Windows NT® , the driver is installed at the same time as the utility installation.

(2) Installation precautions

The following are the precautions when installing the software package.

- Log on as a user having administrator authority.
- Make sure to close other applications running on Windows® (including resident software such as antivirus software) before installation.
- The installer may not work normally because the update program of operating system or other companies' software such as Windows Update and java update may start automatically. Please install the driver after changing the setting of the update program not to start automatically.
- Check if the display settings on the [Device Manager] or other relevant functions are correct, and install an appropriate display driver.
  Or update the Windows® operating system.
- The language switching function of the operation system set by "Regional and Language Options" on the Control Panel screen is not supported. The installation or uninstallation may not work normally if the language setting is changed.

(3) Installing utility
This section explains a procedure for installing the CC-Link Ver.2 board utility.

(a) Installation
1) Insert the CD-ROM to the CD-ROM drive.
2) Double click the "Setup.exe" file on the CD-ROM
3) By following the on-screen instructions, select or enter the necessary information (For instructions which are difficult to determine, refer to (5)).

(b) When installation is completed normally
When the installation is completed normally, the icons shown below are registered in the Windows® Start menu.

[Start] - [Program] - [MELSEC] or
[Start] - [All Programs] - [MELSEC]

Icon	Utility name	Description
	CC-Link Ver.2 utility	Starts the CC-Link Ver.2 utility.
	Device Monitor Utility	Starts Device Monitor Utility.
or	MELSEC Data Link Function HELP	Starts HELP for the Data Link Function.

(c) When installation is aborted or failed
When the installation is aborted or failed, reinstall the utility by the following procedure.
1) If the utility can be uninstalled, uninstall it.
(Refer to Section 8.4.2)
2) Restart the personal computer.
3) Install the utility by following the installation procedure.

(4) Installing the driver
The following explains the installation procedure of the CC-Link Ver.2 board driver.

POINT
When using Windows NT®, the driver is installed at the same time as the utility installation.

(a) Installation
1) Power OFF the personal computer and install the CC-Link Ver.2 board to the personal computer.
2) Power ON the personal computer and insert the CD-ROM to the CD-ROM drive.
3) By following the on-screen instructions described below for each operating system, select or enter the necessary information.
(For instructions which are not described below and are difficult to determine, refer to (5) in this section.)

1) Using Windows® 2000

1) The "Found New Hardware Wizard" screen is displayed. Select "Search for a suitable driver for my device (recommended)" and click the Next> button.

↓
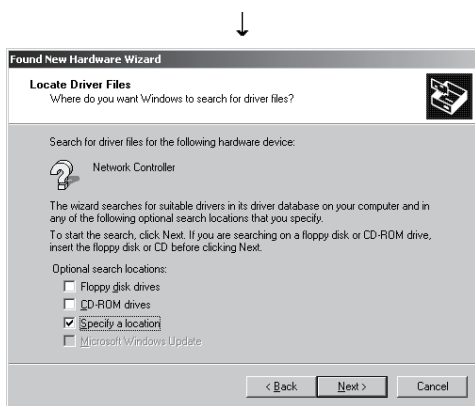
2) Select "Specify a location" and click the Next> button.

↓
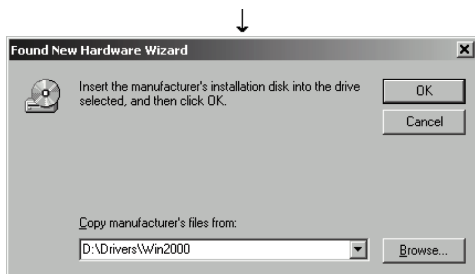
3) Specify "\Drivers\Win2000" of the CD-ROM drive to be used for "Copy manufacturer's files from".
(Example: "D:\Drivers\Win2000")
Click the OK button.

↓

(End)

2) Using Windows® XP/ Windows® 2003 R2
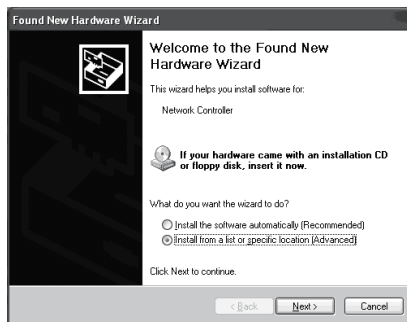
1) The "Found New Hardware Wizard" screen is displayed.
   Select "Install from a list or specific location (Advanced)" and click the ⌷ Next> ⌷ button.

↓
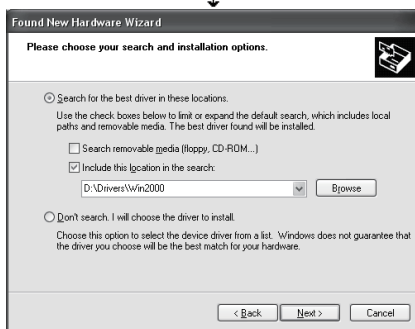
2) Select "Search for the best driver in these locations".
   Check "Include this location in the search" and specify "\Drivers\Win2000" of the CD-ROM drive to be used.
   (Example: "D:\Drivers\Win2000")

↓

(End)

3) Using Windows Vista® / Windows Server® 2008
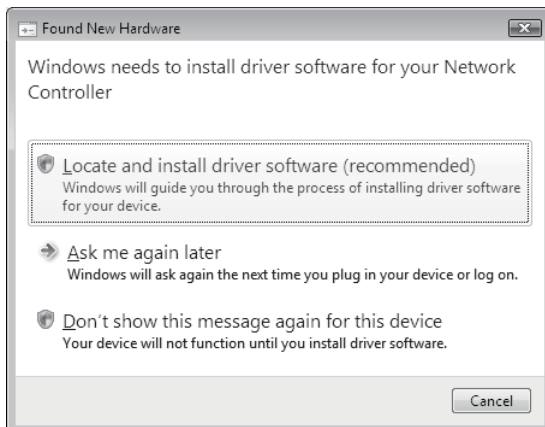
1) The "Found New Hardware" screen is displayed.
   Select "Locate and install driver software (recommended)".

↓

(End)

4) Using Windows® 7
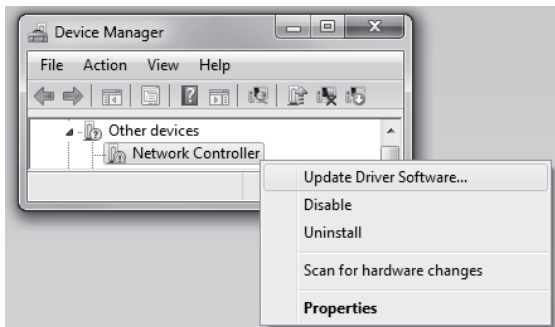
1) Open the Windows® Device Manager screen. Right-click on "Network Controller" and select "Update Driver Software".

↓
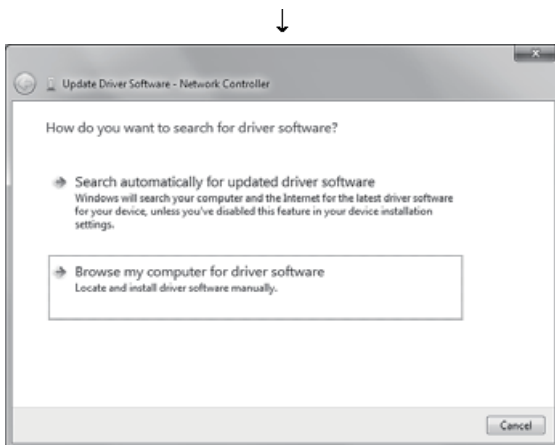
2) Click "Browse my computer for driver software".

↓
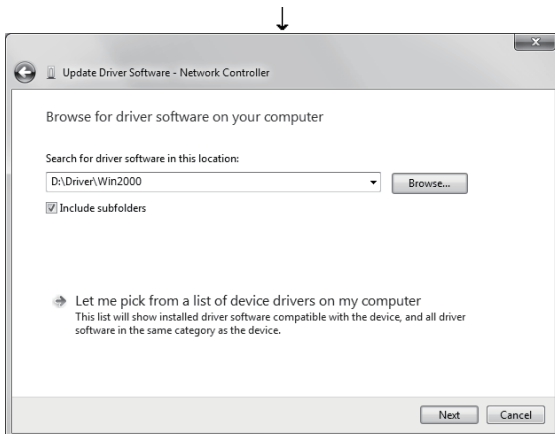
3) Specify "\Drivers\Win2000" of the CD-ROM drive to be used for "Search for driver software in this location" and click the Next button. (Example: "D:\Drivers\Win2000")

↓

(End)

(b) When installation is completed normally

When the installation is completed normally, "PCI MELSEC CC-LINK Ver.2 Controller" is displayed on the Windows Device Manager screen.

Remarks

For Windows 7, "?" is displayed next to the icon, however, the CC-LINK Ver.2 board is recognized normally.

Status after the installation of the CC-Link Ver.2 board.
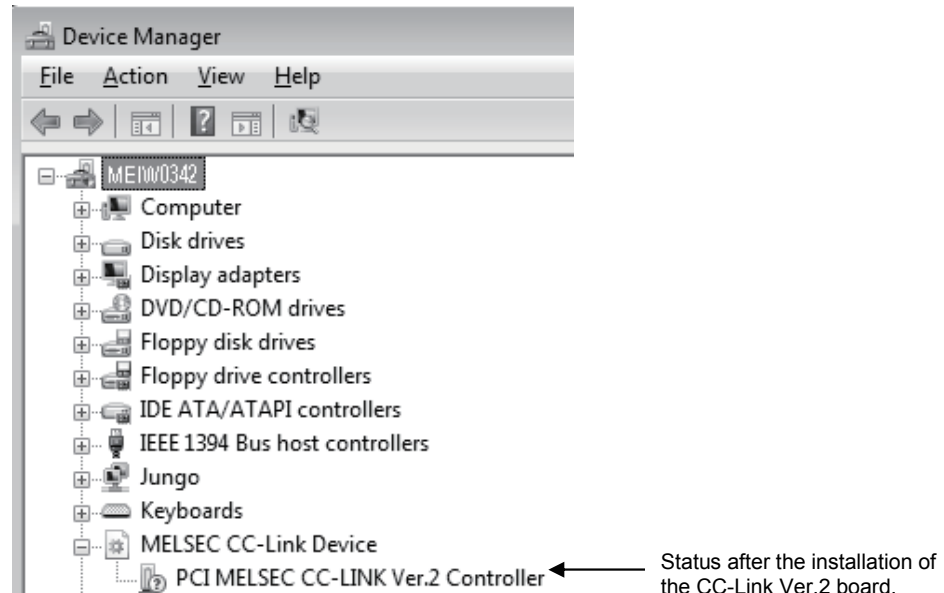
(c) When the installation is aborted or failed

When the installation is aborted or the CC-LINK Ver.2 board is not recognized, reinstall the driver by the following procedure.

1) Delete "PCI MELSEC CC-LINK Ver.2 Controller" on the Windows® Device Manager screen.
2) Restart the personal computer.
3) Install the driver by following the installation procedure.

POINT

If the driver cannot be installed, confirm the following settings.

< For Windows XP >
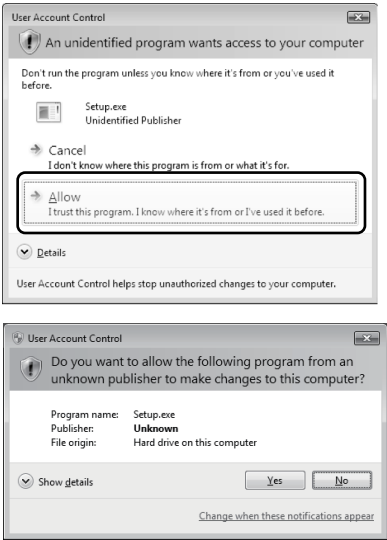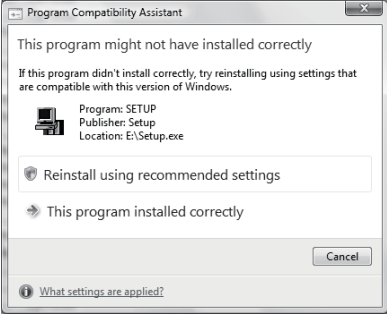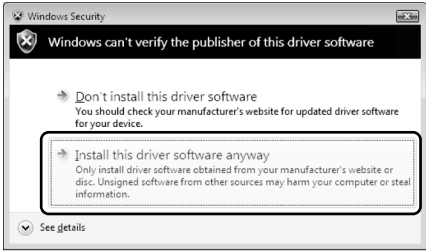
If "Block - Never install unsigned driver software" is selected under [Control Panel] - [System] - [Hardware] - [Driver Signing], the driver may not be installed.

Select "Ignore - Install the software anyway and don't ask for my approval", or "Warn - Prompt me each time to choose an action", and install the driver.

(5) The screens displayed during installation and the procedure
For the screens displayed during the installation, follow the procedures as instructed below.

(a) Using Windows NT® /Windows® 2000/
Windows Server® 2003 R2/Windows® XP

Screens	Procedure
ReadOnly File Detected — An option you selected requires that files be installed to your system, or files be uninstalled from your system, or both. A read-only file, D:\WINDOWS\System32\MdFunc32.dll, was found while performing the needed file operations on your system. To perform the file operation, click the Yes button; otherwise, click No. □ Don't display this message again. [Yes] [No] [Cancel]	Click the Yes button.
Software Installation — ⚠ The software you are installing has not passed Windows Logo testing to verify its compatibility with this version of Windows. (Tell me why this testing is important.) Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the software vendor for software that has passed Windows Logo testing. [Continue Anyway] [STOP Installation]	This screen is displayed at the first installation. Click the Continue Anyway button. The operation test has been conducted by Mitsubishi. (Problems do not occur after the installation.) The following screen may appear behind another screen. Then, press the Alt + Tab keys to bring it to the front.
Security Alert - Driver Installation — ⚠ The driver software you are installing for: WinDriver has not been properly signed with Authenticode(TM) technology. Therefore, Windows cannot tell if the software has been modified since it was published. The publisher's identity cannot be verified because of a problem: The installed INF file does not contain digital signature information. Do you still want to install this driver software? [Yes] [No] [More Info]	Click the Yes button.
Found New Hardware Wizard — Welcome to the Found New Hardware Wizard. Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission). Read our privacy policy. Can Windows connect to Windows Update to search for software? ○ Yes, this time only ○ Yes, now and every time I connect a device ● No, not this time. Click Next to continue. [< Back] [Next >] [Cancel]	For operating system of Windows® XP Service Pack2 or later, the confirmation screen for connection to Windows Update may be displayed. Select "No, not this time" and click the Next button.

(b) Using Windows Vista® /Windows Server® 2008/ Windows® 7

Screens	Procedure
	This screen appears when user account control is enabled. Click "Allow" or the Yes button.
	If this screen is displayed during the installation or at the installation completion, click "This program installed correctly". If this screen is displayed when the installation is aborted, click the Cancel button and close the screen. Do not select "Reinstall using recommended settings". An incorrect module may be installed.
	Click "Install this driver software anyway"

8.4.2 Uninstallation

This section explains a procedure for uninstalling the software package.

(1) Uninstallation precautions

The following are the precautions when uninstalling the software package.
- Log on as a user having administrator authority.
- Make sure to close other applications running on Windows® (including resident software such as antivirus software) before installation.
- Check if the display settings on the [Device Manager] or other relevant functions are correct, and install an appropriate display driver.
  Or update the Windows® operating system.
- The language switching function of the operation system set by "Regional and Language Options" on the Control Panel screen is not supported.
  The installation or uninstallation may not work normally if the language setting is changed.

(2) Uninstallation procedure

1) Uninstall the software package from the control panel of Windows®.

POINT
If the dialog box confirming the deletion of common files appears at uninstallation, make the setting to keep all common files. If deleting common files, other applications may not operate normally.

(3) When uninstallation is completed normally

When the uninstallation is completed normally, the icons registered in the Windows® Start menu are deleted.

(4) When uninstallation is failed

When the uninstallation is failed, perform the following procedure.

1) Insert the CD-ROM to the CD-ROM drive.
2) Display the "Run" screen from the Windows® Start menu.
3) Append "-A" and execute "Setup.exe" of the CD-ROM.
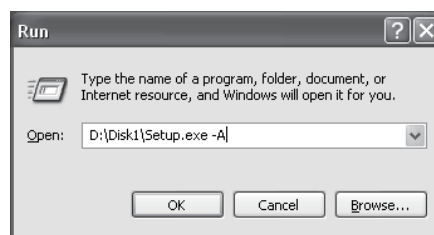
4) Install the software package by following the installation procedure.
5) Uninstall the software package.

8.5 Checking the Board Status (Hardware Test)

The hardware test checks whether or not board works properly by itself.
Always perform this hardware test before configuring the system.

Execute the hardware test according to the following procedure:

```
                    ┌──────────────────────────────┐
                    │            Start             │
                    └──────────────────────────────┘
                                   │
                                   ▼
        ┌──────────────────────────────────────────┐
        │ Connect the terminal resistor supplied    │
        │ with the CC-Link Ver.2 board between the   │
        │ DA and DB terminals of the CC-Link Ver.2   │
        │ board.                                     │
        └──────────────────────────────────────────┘
                                   │
                                   ▼
        ┌──────────────────────────────────────────┐
        │ Perform the hardware test on the test      │  · · · · · Refer to Section 9.2.8
        │ screen of CC-Link Ver.2 Utility.           │
        └──────────────────────────────────────────┘
                                   │
                                   ▼
                    ┌──────────────────────────────┐
                    │             End              │
                    └──────────────────────────────┘
```
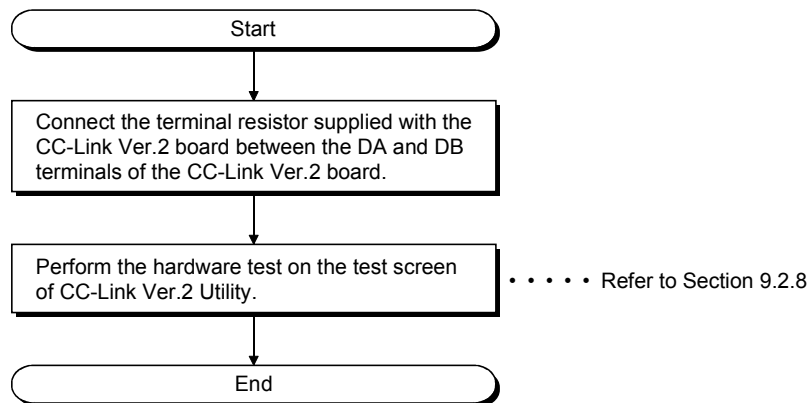
8.6 Connecting the Modules Using the CC-Link Dedicated Cable

This section explains the cable connection in the CC-Link system.

IMPORTANT
(1) Be sure to turn off the power to the corresponding station before attaching and removing a terminal block. If the terminal block is attached or removed without turning off the power to the corresponding station, normal data transfer will not be guaranteed.
(2) The CC-Link dedicated cables, the high-performance CC-Link dedicated cables and Ver.1.10-compatible CC-Link dedicated cables cannot be used together. If they are used together, normal data transfer will not be guaranteed.
(3) Always ground the SLD terminal of the CC-Link Ver.2 board and the personal computer to the protective ground conductor. Not doing so can cause a malfunction.

(1) CC-Link cables can be connected from any station number.

(2) Be sure to connect the terminal resistors supplied with the board/module between the "DA" and "DB" terminals of both end stations in the CC-Link system.

(3) Terminal resistors to be connected are different depending on the cable used by the CC-Link system:

Cable type	Terminal resister
CC-Link dedicated cable	110 Ω 1/2 W (brown - brown - brown)
Version 1.10-compatible CC-Link dedicated cable	
CC-Link dedicated high-performance cable	130 Ω 1/2 W (brown - orange - brown)

(4) M3 screws are used for terminal block screws. The type of applicable solderless terminal is 1.25-3. Solderless terminals with insulation sleeve cannot be used.

(5) The master station can be connected at points other than both ends.

(6) A star connection is not allowed. For the T-branch connection, refer to Section 8.7, "T-branch Connection Using the CC-Link Dedicated Cable."

(7) The connection method is shown below.
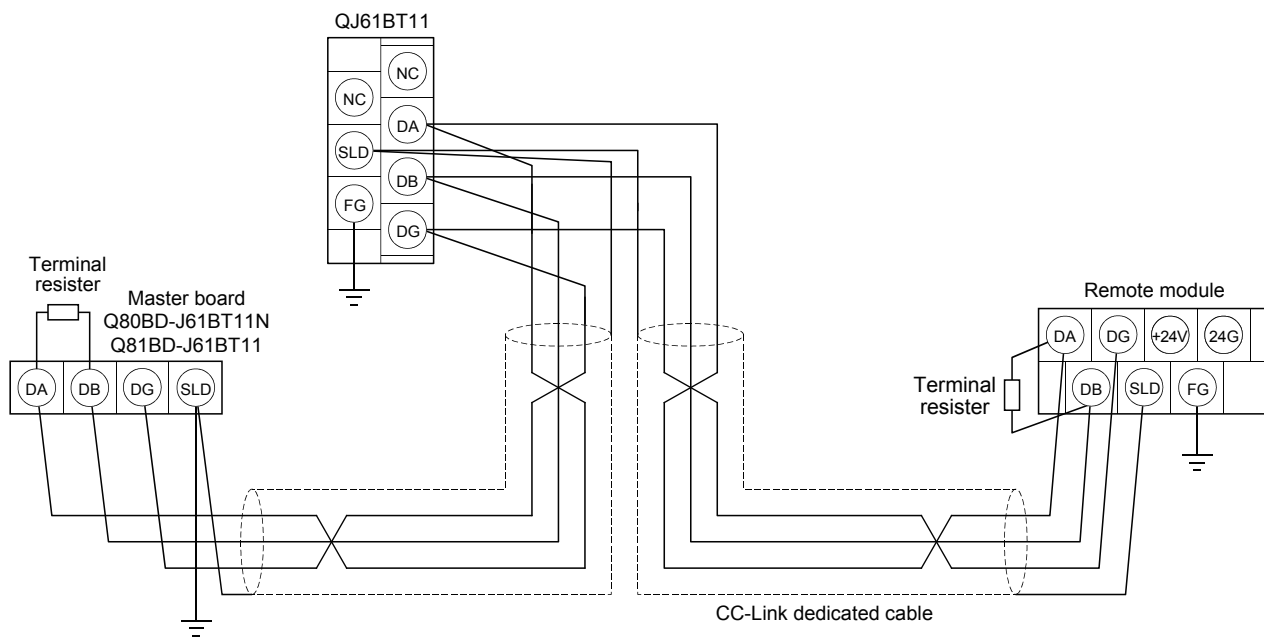
[Simplified diagram]
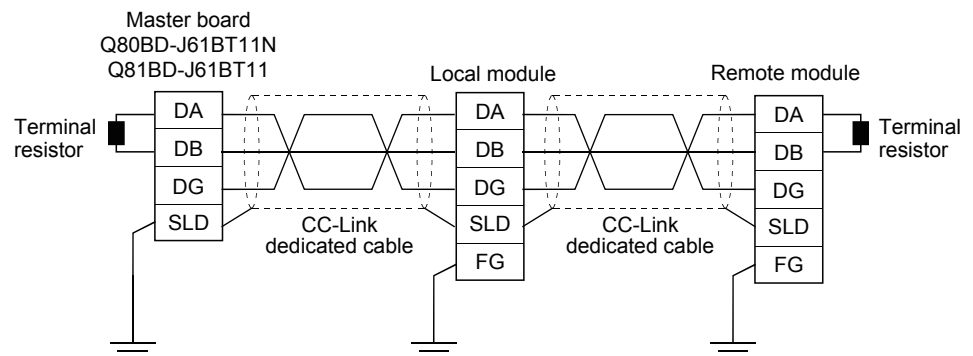
POINT

Each module has a different terminal block layout.

Exercise caution when wiring the system.

8.7 T-Branch Connection with the CC-Link Dedicated Cable

This section explains how to perform a T-branch connection using the CC-Link dedicated cable.

8.7.1 T-Branch system configuration

The following shows a system configuration using T-branch connection.
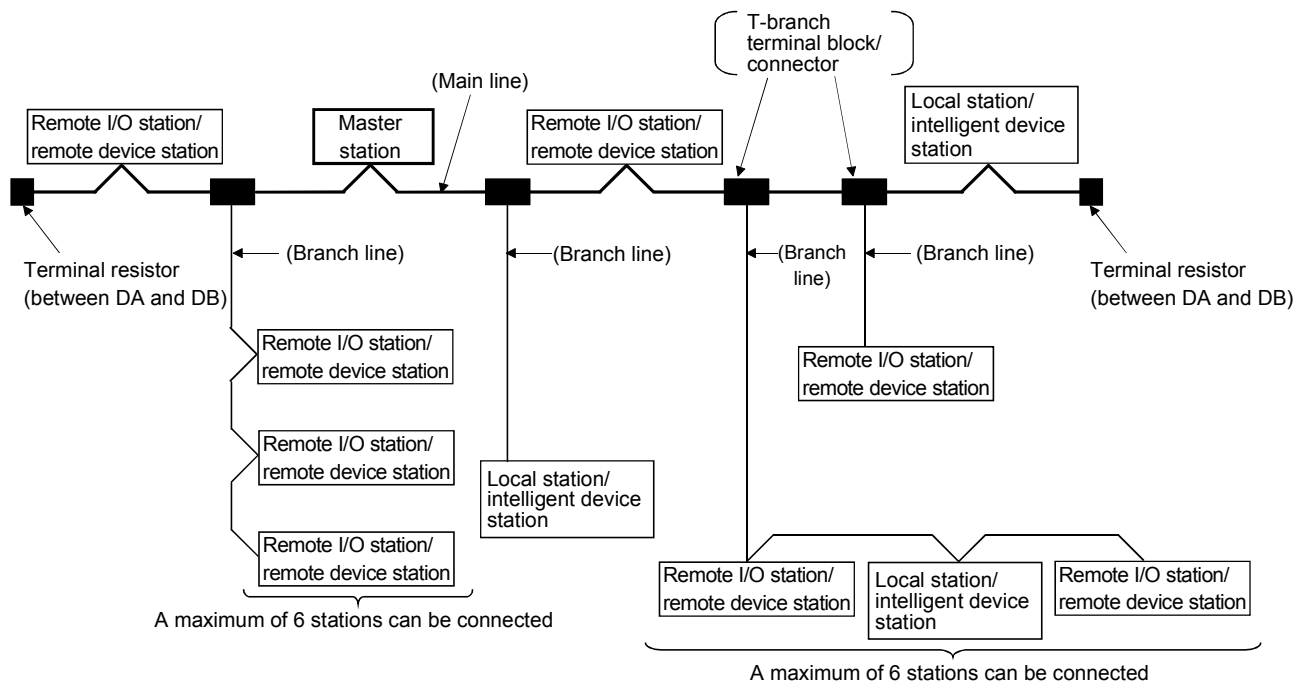
* The number of branch lines is determined by the branch line length per branch line and the overall branch line length.

8.7.2 T-Branch communication specifications list

The following explains the communication specifications for T-branch connection.
For communication specifications not listed below, refer to Section 4.2 "Performance Specifications."

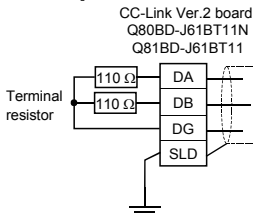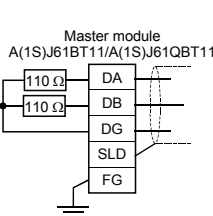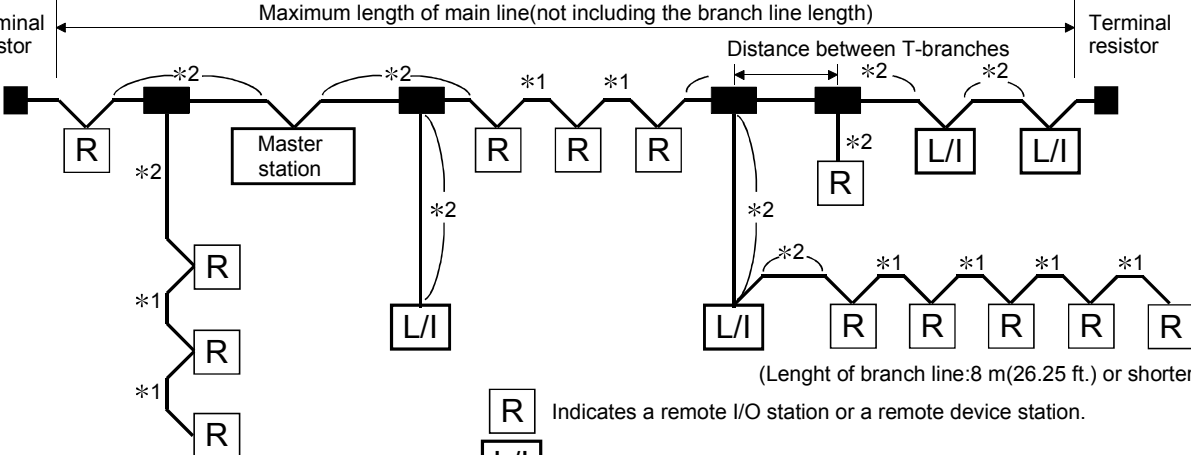| Item	Specification		Remarks
Transmission rate	625 kbps	156 kbps	10 M/5 M/2.5 Mbps are not allowed to use.
Maximum length of the main line	100 m (328.1 ft.)	500 m (1640.5 ft.)	Indicates the length of the cable between terminal resistors. The length of the T-branch cable (branch line length) is not included.
Maximum length of the main line	8 m (26.25 ft.)		Indicates the overall cable length per branch.
Overall branch line length	50 m (164.05 ft.)	200 m (656.2 ft.)	Indicates the overall length of the entire branch cable.
Maximum number of connected stations on the branch line	6 stations per branch		The total number of connected stations depends on the CC-Link specifications.
Connected cable	CC-Link dedicated cable Ver 1.10 corresponding CC-Link dedicated cable		• The CC-Link dedicated high performance cable cannot be used (example: FANC-SBH). • Mixed use of the CC-Link dedicated cables made by different manufacturers is not allowed. • Mixed use of the Ver. 1.10 compatible CC-Link dedicated cables made by different manufacturers is not allowed.
Terminal resistor (connection method) / Only when the I/F board, A(1S)J61BT11 or A(1S)J61QBT11 is used as the master station. When the QJ61BT11 is used as the master station, connect the 110 Ω resistor that is supplied with the module. For the connection method, refer to Section 8.6. /	$110\,\Omega \pm 5\,\%$, 1/2 W $\times$ 4 (Connect between DA and DG/DB and DG)...both ends [Connection]		• Use a commercially available terminal resistor of $110\,\Omega \pm 5\,\%$, 1/2 W resistance. • 110 Ω and 130 Ω resistors that are supplied with the CC-Link Ver.2 board, master/local modules cannot be used.
T-branch terminal block/connector	• Terminal block: Off-the-shelf terminal block • Connector: Connector NECA4202 for the FA sensor (ICE947-5-2) comparable product is recommended.		• When wiring cables for the main line side, try not to remove the covering as much as possible.

Maximum length of main line, distance between T-branches, and length of cable between stations.	The CC-Link dedicated cable, Ver. 1.10 compatible CC-Link dedicated cable (terminal resistor of 110 Ω used).

Transmission rate	Maximum length of main line	Distance between T-branches	Length of cable between the remote I/O stations or remote device stations [1]	Length of cable between the master/local station or intelligent device station and the adjacent station(s) [2]
625 kbps	100 m (328.1 ft)	No limit	30 cm (11.8 in.) or longer	1 m (3.28 ft.) or longer ([1])/ 2 m (6.56 ft.) or longer ([2])
156 kbps	500 m (1640.5 ft)			

[1]: The cable length of 1 m (3.28 ft.) or longer is for a system configured only with remote I/O stations and remote device stations.

[2]: The cable length of 2 m (6.56 ft.) or longer is for a system configuration that contains local stations and intelligent device stations.

R Indicates a remote I/O station or a remote device station.

L/I Indicates a local station or an intelligent device station.

8.8 Utility Software Settings

This section explains the settings required for the CC-Link Ver.2 board.

8.8.1 Station number setting

The following explains how to set the station numbers for the master station, local station, standby master station, remote station and intelligent device station.
For details on the station number settings, refer to Section 9.2.3.

Specify the station numbers according to the following conditions:

(1) Assign sequential station numbers.
Station numbers can be specified regardless of the order in which the stations are connected.
For a module occupying two or more stations, specify the first station number.

(2) Specify unused station numbers as reserved stations.
If unused station numbers are not specified as reserved stations, they will be handled as data link faulty stations (can be checked with special link registers SW0080 to SW0083).

(3) Specify unique station numbers.
If duplicate station numbers are specified, an installation error occurs. (Error codes are stored in SW0069)

[Setting example] One station was skipped when station numbers were specified.
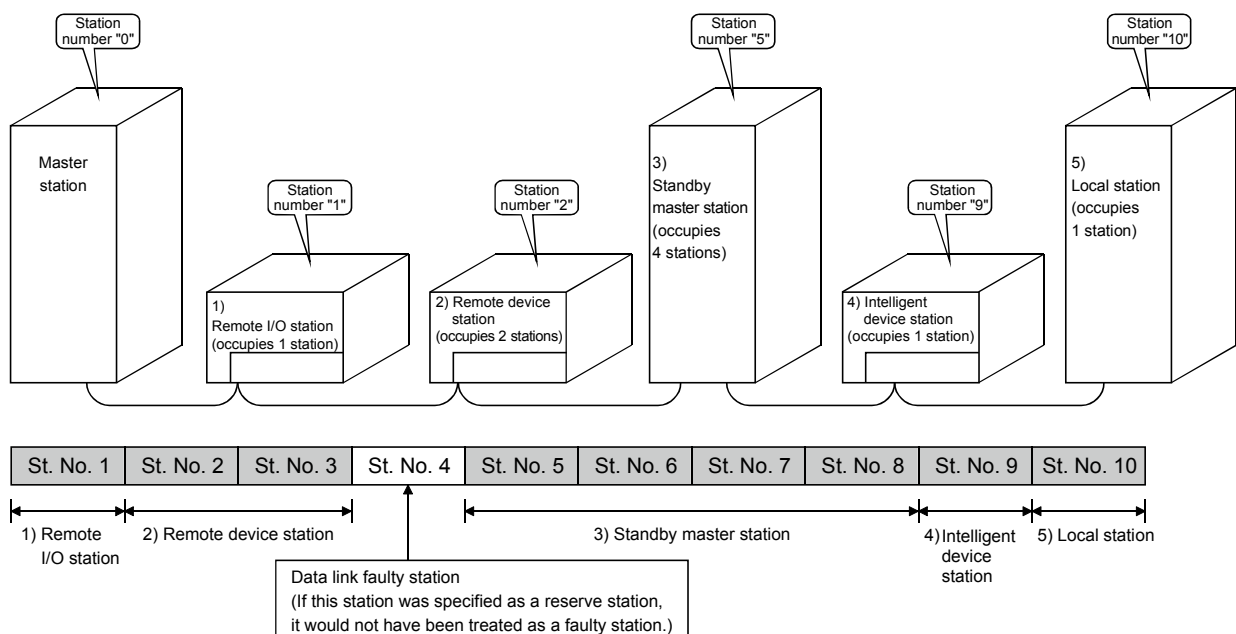
8.8.2 Transmission rate and mode settings

The transmission rate and mode settings are specified with the CC-Link Ver.2 Utility.
For details on the transmission rate/mode settings, refer to Section 9.2.5.

The transmission rates that can be set vary depending on the overall distance.
For more details, refer to Section 3.2.

POINT
Use the same transmission rate for the master station, remote stations, local stations, intelligent device stations and standby master station. If any of the settings for at least one station is different, data link cannot be established normally.
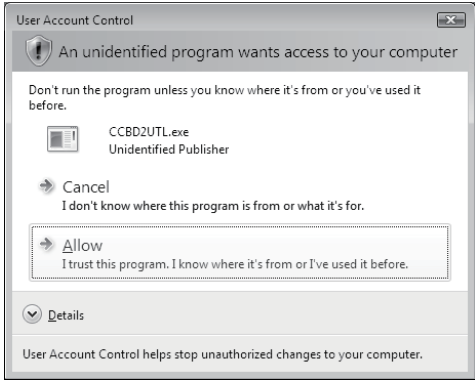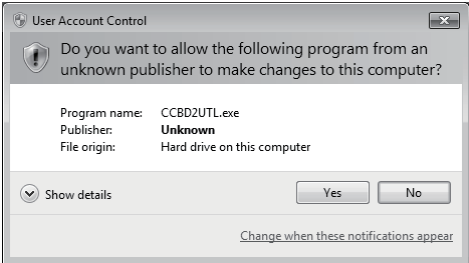
MEMO

9 OPERATING THE UTILITY SOFTWARE

9.1 Operations Common to All Utility Software

This section explains the operations common to all utility software.

> **POINT**
>
> Logon as a user who has administrator authority. *1
>
> *1: When a utility is run while user account control (UAC) is available, the following warning screen appears. Select "Allow" to run the utility.
>
> <Using Windows Vista®   <Using Windows® 7>
> /Windows® 2008>
>
>
>
> For details on how to prevent this screen from being displayed, refer to Appendix 7.

9.1.1 Starting a utility

Start a utility by clicking one of the following menus under the [Start] - [All Programs] *1
- [MELSEC] menus.

MELSEC CC-Link Ver.2 Utility	Starts the CC-Link Ver.2 Utility.
MELSEC Data Link Function HELP	Starts the Help for the communications functions.
Device Monitor Utility	Starts the Device Monitor Utility.
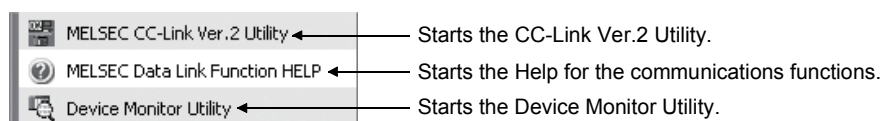
*1: When Windows NT or Windows 2000 is used, [Programs] is displayed.

9

9.1.2 Starting the device monitor utility

The following explains how to start the Device Monitor Utility from the CC-Link Ver.2 Utility.

The Device Monitor Utility can be started by clicking the $\boxed{\text{Device Monitor}}$ button at the bottom of the CC-Link Ver.2 Utility screen.
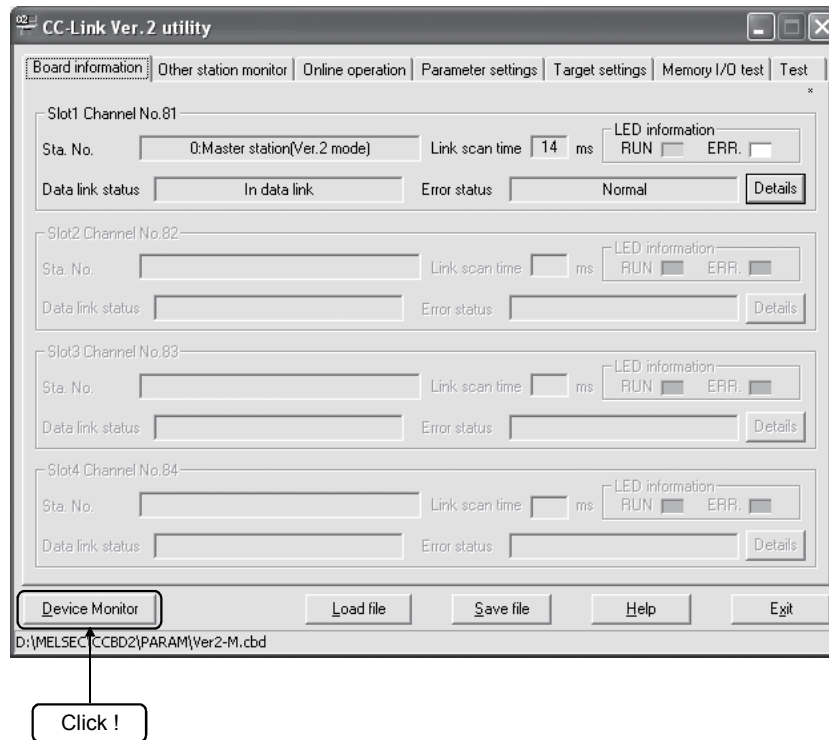
Click !

9.1.3 Quitting a utility

The following explains how to exit each utility.

(1)   Exiting CC-Link Ver.2 Utility
To exit the utility, click the Exit button at the bottom of the utility screen.
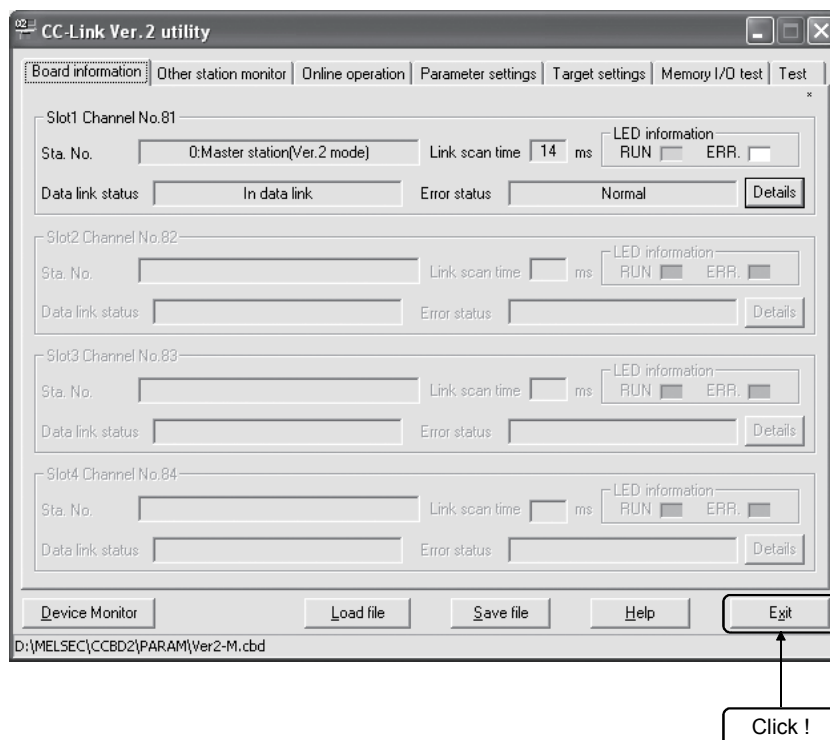
Click !

(2)   Exiting the Device Monitor Utility
To quite the Device Monitor Utility, click [Menu] - [Exit] on the menu bar.
When a dialog box is displayed, click the Yes button to quite the Device
Monitor Utility.

Click !
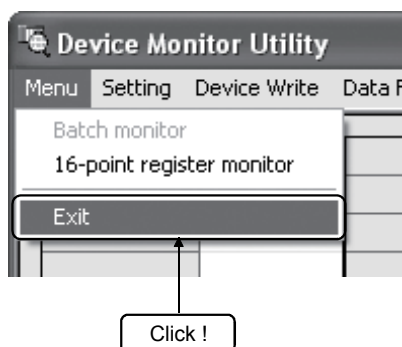
9.1.4 Saving parameters into file

The following describes how to save set parameters into a file.
The parameters to be saved are those set on the Parameter Setting screen (refer to Section 9.2.5) and the Target Setting screen (refer to Section 9.2.6).
All parameters for channels No.81 to 84 are saved.

(1) Click the | Save file | button on the utility screen.
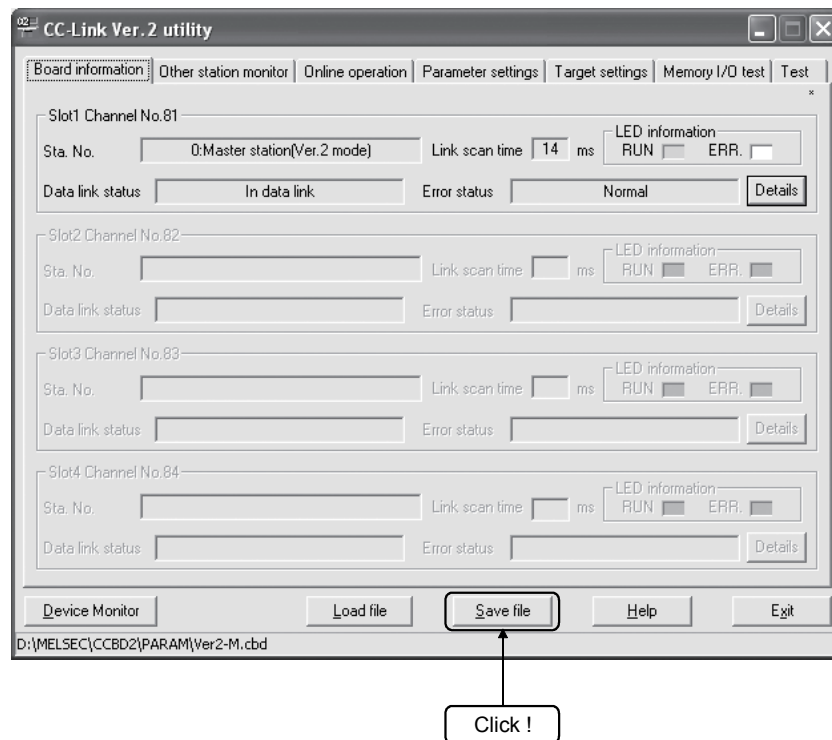
(2) The "Save As" dialog box is displayed. Name and save the file.
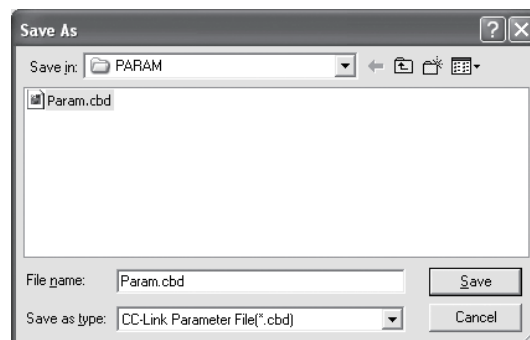
POINT
Parameters can be easily imported to other systems by saving them as a file and reading the file from another system.

9.1.5 Reading the file

The following describes how to read saved parameters with the utility.

(1) Click the ⎿ Load file ⏌ button on the utility screen.
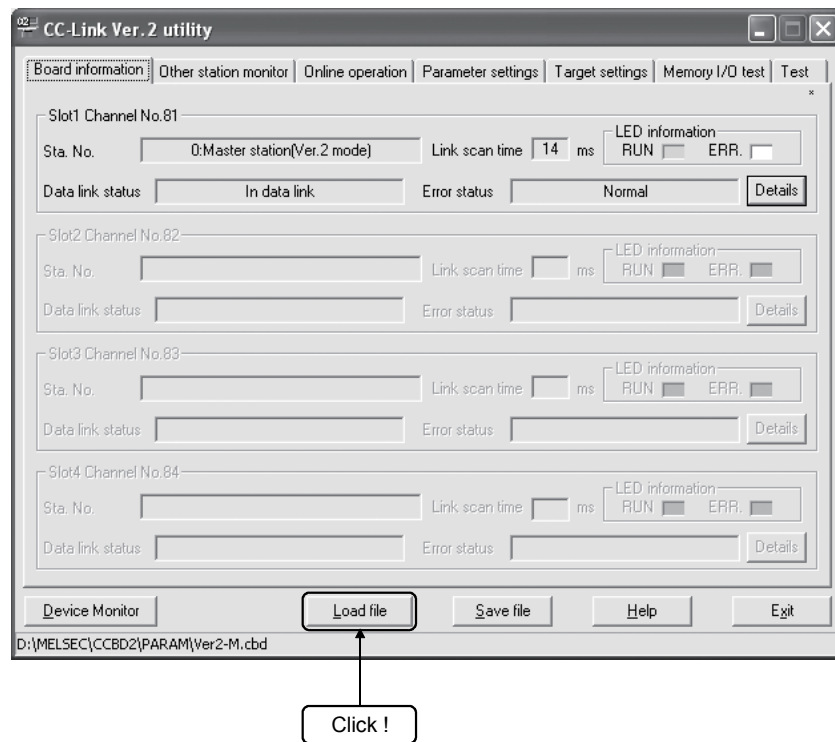
Click !

(2) The "Open" dialog box is displayed. Select the file to be read.
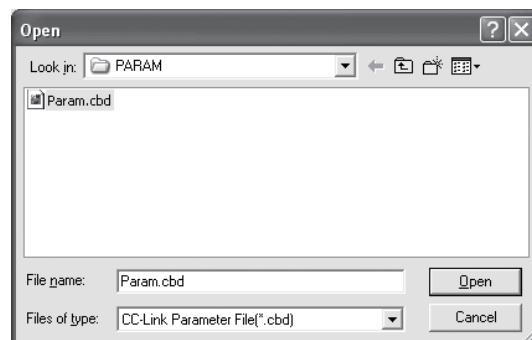
9.1.6 Displaying the help screen

The following explains how to display the Utility Help screen.

(1)   To display the Help screen of the CC-Link Ver.2 Utility
Click the ⌷ Help ⌷ button at the bottom right of the CC-Link Ver.2 Utility screen.
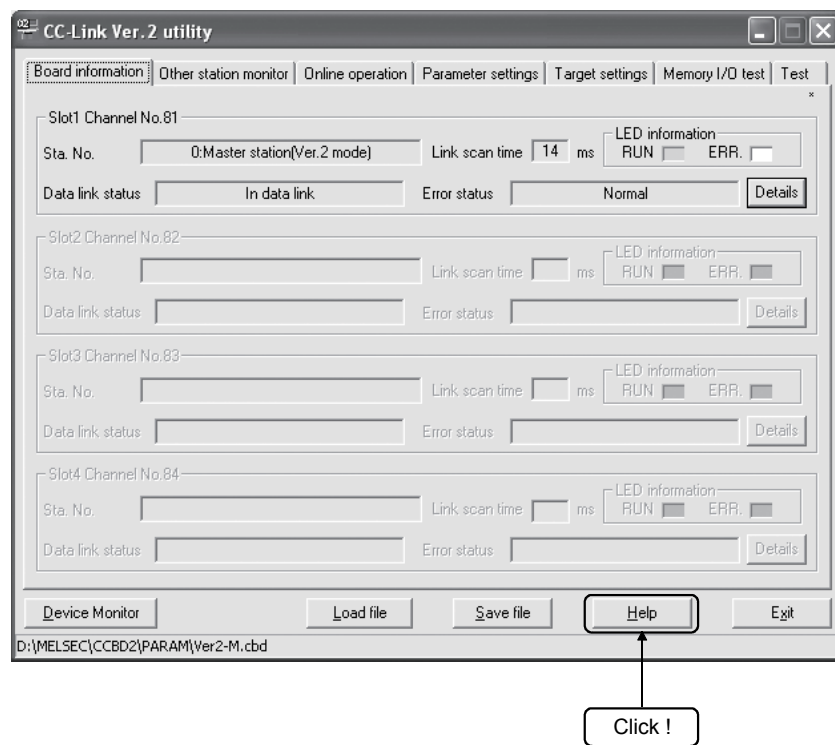
(2)   To display the Help screen of the Device Monitor Utility
Click [Help] - [Help] on the menu bar of the Device Monitor Utility screen.
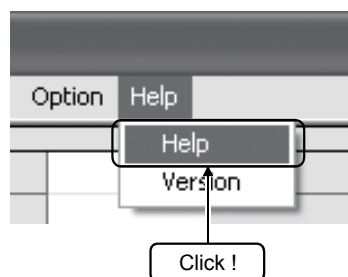
POINT

When Help is run, the following "Windows Help and Support" screen may appear, and the Help screen is not displayed.
Perform the following procedure to install "WinHlp32.exe", which is needed to display the Help screen. (Note: The personal computer needs to be connected to the internet.)

<Using Windows Vista®   <Using Windows® 7>
/Windows® 2008>
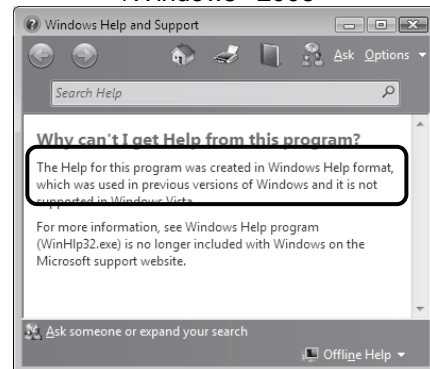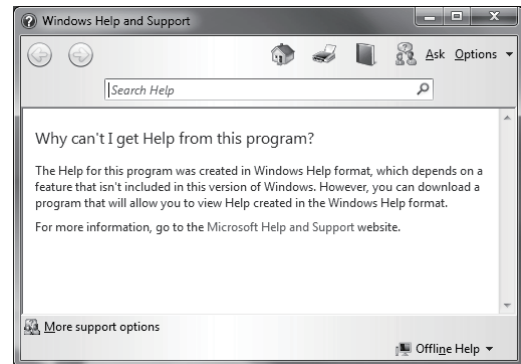
(1) Click the │ Help │ button.
(2) The screen shown above opens. Click the link section.
(3) The Microsoft technical information page opens.
   http://support.microsoft.com/kb/917607 (As of May 2010)
   Follow the instruction and download the Windows Help program (WinHlp32.exe).
(4) Install the file that has been downloaded.

9.1.7 Verifying the version

The following explains how to verify the utility's version.

(1) To verify the version of the CC-Link Ver.2 Utility
Select "Version information" from the right click menu of the title bar with CC-Link Ver.2 utility.
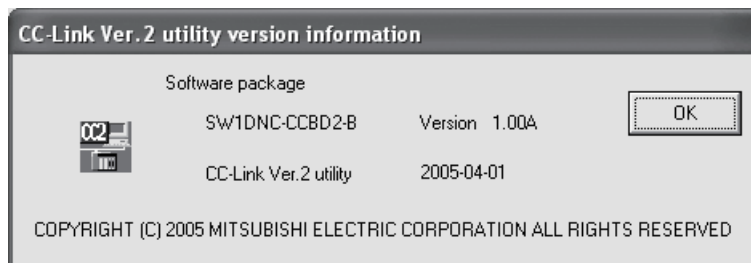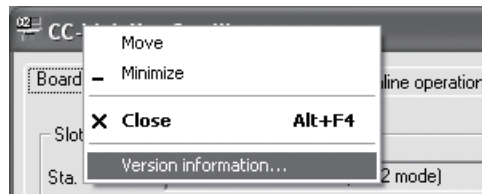
(2) To verify the version of the Device Monitor Utility
Click [Help] - [Version] on the menu bar of the Device Monitor Utility screen.
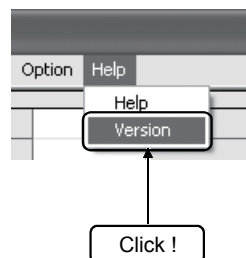
9.2 CC-Link Ver.2 Utility

This section explains how to operate the CC-Link Ver.2 Utility.

9.2.1 List of CC-Link Ver.2 Utility Functions

The following describes the functions of the CC-Link Ver.2 Utility.

Functions		Description	Reference
Board information		Displays the various information (station No., transmission rate, data link status, etc.) of the CC-Link Ver.2 board.	Section 9.2.2
Other station monitor		Displays the status of other stations currently connected to the CC-Link system.	Section 9.2.3
Online operation		Performs read, write and verification of parameters on the CC-Link Ver.2 board.	Section 9.2.4
Parameter settings		Sets the parameters of the CC-Link Ver.2 board.	Section 9.2.5
Target settings		Performs setups for accessing a multiple CPU system.	Section 9.2.6
Memory I/O Test		Diagnoses the CC-Link Ver.2 board memory.	Section 9.2.7
Test	Hardware test	Tests whether or not the CC-Link Ver.2 board is operating correctly.	Section 9.2.8
	Line test (Hardware)	Checks whether or not CC-Link cables are correctly connected to enable the data link.	
	Line test (Software)	Checks whether or not parameters are correctly set to perform the data link correctly.	
	Network test	Checks whether or not the data link on the own station starts/stops correctly.	
Save file		Writes preset parameters into a file.	Section 9.1.4
Load file		Reads out saved parameters.	Section 9.1.5
Help		Displays the Help of the CC-Link Ver.2 utility	Section 9.1.6

9.2.2 Operating the Board information screen

This screen displays the various information of the CC-Link Ver.2 board currently mounted on the PC.

(1) Board information screen

Item	Description
1) Slot1 board	Displays the information of the Slot1 CC-Link Ver.2 board.
2) Sta. No.	Displays the station No., station type and operation mode of the CC-Link Ver.2 board. (Example)　　0 : Master station (Ver.2 mode) Station No.　　Operation mode 　　　Station type
3) Link scan time	Displays the current link scan time.
4) LED information	Displays the ON/OFF status of the LEDs.
5) Data link status	Displays the data link status in the CC-Link system.
6) Error status	Displays the status of the currently detected error.
7) ⌴Details⌴ button	Displays the Board detail information screen where the details of the CC-Link Ver.2 board can be verified. For more information about the Board detail information screen, refer to "(2) Board detail information screen."
8) Slot2 to Slot4 board	Displays the information of the Slot2 to Slot4 CC-Link Ver.2 boards. For the display details, refer to the "Slot1 board" above.

(2) Board detail information screen

Item	Description
1) Channel No.	Displays the channel number.
2) Sta. No.	Displays the station No., station type and operation mode.
3) Transmission rate	Displays the transmission rate.
4) Data link status	Displays the data link status in the CC-Link system. | Status	Description
In data link	Data link is being executed.
Suspend data link	Data link has stopped.
Initial status	Data link is in the initial status.
Waiting for receiving parameters	Parameters have not been received yet.
Disconnecting (no request polling)	There is no polling from the master station, and the data link is in the cut-off status.
Disconnecting (link error)	Data link is in the cut-off status due to a line error.
Disconnecting (other)	Data link is in the cut-off status due to any other reason.
During line test	The line test is being conducted.
During parameter setting test	The parameter setting test is being performed from the master station.
During Auto-Returning	The disconnected station is being returned to the network automatically.
During reset	The CC-Link Ver.2 board is being reset.	
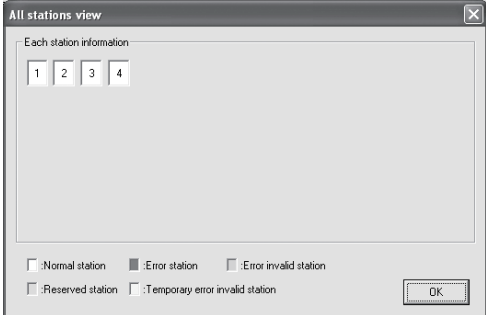
Item	Description
5) Error status	Displays the status of the error currently detected. <table><tr><td>Display</td><td>Description</td></tr><tr><td>Normal</td><td>Normal status</td></tr><tr><td>Transport error</td><td>An error was detected in the transmission path.</td></tr><tr><td>Parameter error</td><td>A parameter error was detected.</td></tr><tr><td>CRC error</td><td>An error in the received data was detected.</td></tr><tr><td>Timeout error</td><td>A timeout error was detected in data reception.</td></tr><tr><td>Abort error</td><td>An error was detected in data communications.</td></tr><tr><td>Setting error</td><td>An error was detected in the station No./station type setting, the transmission rate setting or the mode setting.</td></tr><tr><td>Illegal</td><td>An error arising from some other cause was detected.</td></tr></table>
6) Board type	Displays the model name of the CC-Link Ver.2 board.
7) Product information	Displays the product information (serial No., function version).
8) IRQ No.	Displays the IRQ No.
9) ROM version	Displays the ROM version.
10) Memory	Displays the 2-port memory.
11) I/O port	Displays the I/O ports.
12) Present Error	An error code of the error currently identified on the CC-Link Ver.2 board is indicated in hexadecimal notation. When no error is currently detected, "No Error" is displayed.
13) Link scan time (ms)	Displays the maximum, minimum and current link scan times.
14) LED information	Displays the following LED states. <table><tr><td>LED</td><td>Color</td><td>ON</td><td>OFF</td><td>Flashing</td></tr><tr><td>RUN</td><td>Green</td><td>Operating normally.</td><td>A WDT error has occurred, or the board is being reset.</td><td></td></tr><tr><td>ERR.</td><td>Red</td><td>All stations are faulty.</td><td>No communication error has occurred, or the board is being reset.</td><td>There is a faulty station or station No. is duplicated.</td></tr><tr><td>TIME</td><td>Red</td><td>Due to cable disconnection or noise affecting the transmission path, no responses are received from all stations.</td><td>Responses received from all stations</td><td></td></tr><tr><td>MST</td><td>Green</td><td>Operating as the master station</td><td>Operating as other than the master station</td><td></td></tr><tr><td>SW</td><td>Red</td><td>Switch setting error</td><td>No switch setting error</td><td></td></tr><tr><td>LINE</td><td>Red</td><td>Cable disconnection error</td><td>No cable disconnection error</td><td></td></tr><tr><td>S MST</td><td>Green</td><td>Operating as a standby master station</td><td>Operating as other than the standby master station</td><td></td></tr><tr><td>M/S</td><td>Red</td><td>Station duplicated error</td><td>Station not duplicated</td><td></td></tr><tr><td>LOCAL</td><td>Green</td><td>Operating as a local station</td><td>Operating as other than the local station</td><td></td></tr><tr><td>PRM</td><td>Red</td><td>Parameter error</td><td>No parameter error</td><td></td></tr></table>
15) OK button	Closes the Board detail information screen.
16) Save SB/SW button	Saves the information of all the CC-Link Ver.2 board SB/SW areas selected on this screen in CSV format.

9.2.3 Operating the Other station monitor screen

This screen shows the line status of other stations (all stations) that are currently connected to the CC-Link system.

Other station monitor screen
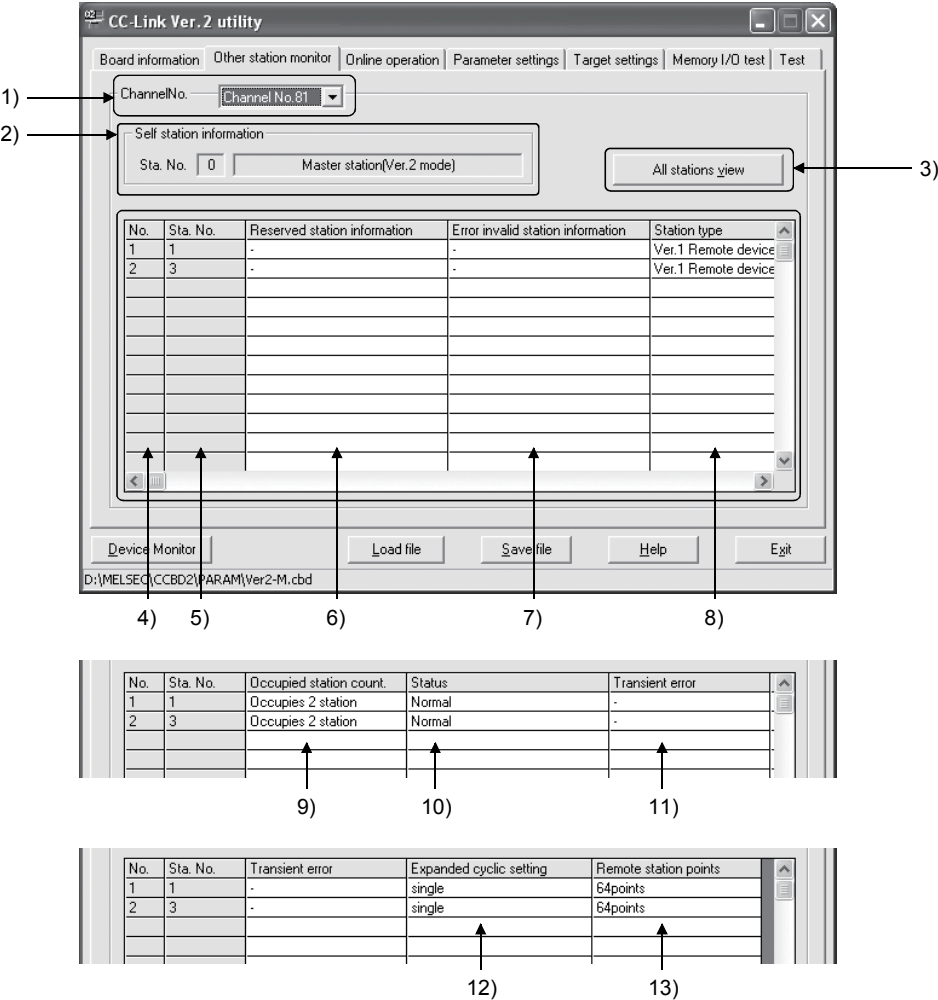
Item	Description
1) Channel No.	Select the target CC-Link Ver.2 board to be monitored.
2) Self station information	Displays the station No., station type, and operation mode of the selected CC-Link Ver.2 board.
3) [All stations view] button	Displays the communications states of other stations.

Item		Description
	4) No.	Displays the number of modules currently connected to the CC-Link system.
	5) Sta. No.	Displays the station No. set to each station.
	6) Reserved station information	Displays whether or not the station is set as a reserved station. | Display	Description
---	---
Reserved station	Set as a reserved station
—	No setting	
	7) Error invalid station information	Displays whether or not the station is set as an error invalid station. | Display	Description
---	---
Error invalid station	Set as an error invalid station
—	No setting	
	8) Station type	Displays the set station type. | Display	Description
---	---
Ver.1 Remote I/O station	Ver.1 Remote I/O station
Ver.1 Remote device station	Ver.1 Remote device station
Ver.1 Intelligent device station	Ver.1 Intelligent station, Ver.1 Local station
Ver.2 Remote device station	Ver.2 Remote device station
Ver.2 Intelligent device station	Ver.2 Intelligent station, Ver.1 Local station	
	9) Occupied station count	Displays the number of occupied stations.
(Information of other stations)	10) Status	Displays the status of each station. | Display	Description
---	---
Normal	Normal communication is being performed.
Temporary error invalidity status	Communication is interrupted.
Data link error	A link error has occurred.
WDT error	A watchdog timer error has occurred.
Blown fuse confirmation error	A fuse has blown.
Repetition station No.	The station No. is repetitived.
Switch changing	The switch has been changed.	
	11) Transient error	Displays the transient error status. | Display	Description
---	---
Transient transmission err	Error detected
—	No error	
	12) Expanded cyclic setting	Displays the value set in the expanded cyclic setting. | Display
---
single
double
quadruple
octuple	
	13) Remote station points	Displays the number of the remote station's points.

9.2.4 Operating the Online operation screen

The parameters are read from, written to and verified with the CC-Link Ver.2 board.
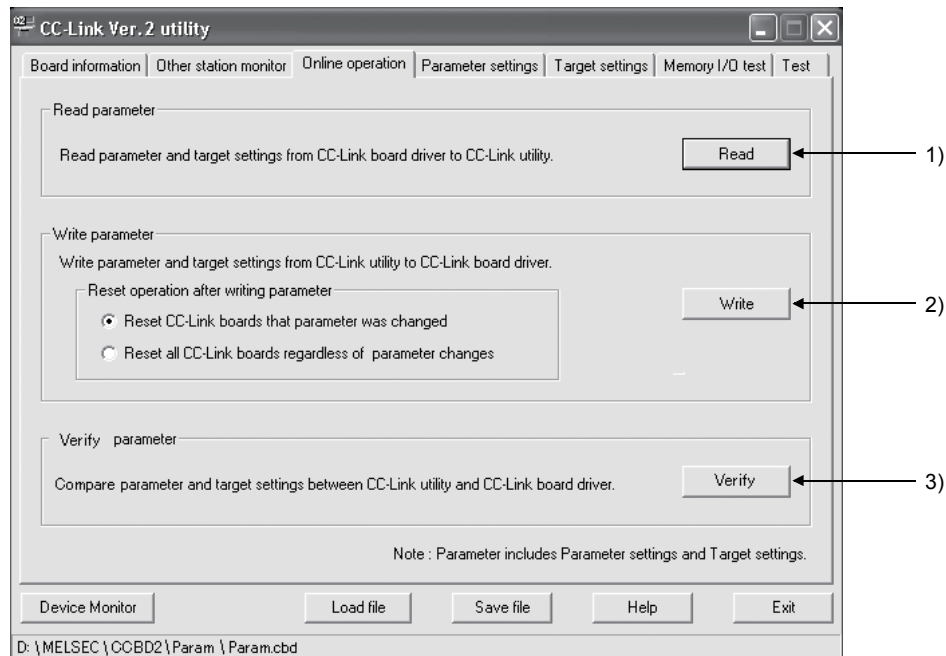
Item	Description
1) Read button	Reads parameters from the CC-Link Ver.2 board.
2) Write button	Writes parameters to the CC-Link Ver.2 board. After writing the parameters, automatically resets the CC-Link Ver.2 board selected in "Reset operation after writing parameter".
3) Verify button	Compares the parameters written to the CC-Link Ver.2 board with those set in the utility. When an error occurs, the error location is displayed. $*1$

∗1: No error details are displayed on the Online operation screen.
If one or more errors are detected, the following dialog box appears.
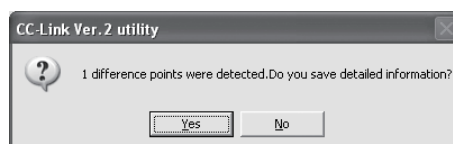
To check the error details, click "Yes" and specify where the information is to be saved.
The detailed error information is saved in the text file so that it can be checked using Windows® "Notepad", for example.

9.2.5 Operating the Parameter Settings screen

Various CC-Link Ver.2 board parameters are set on this screen.

(1)   Parameter Settings screen
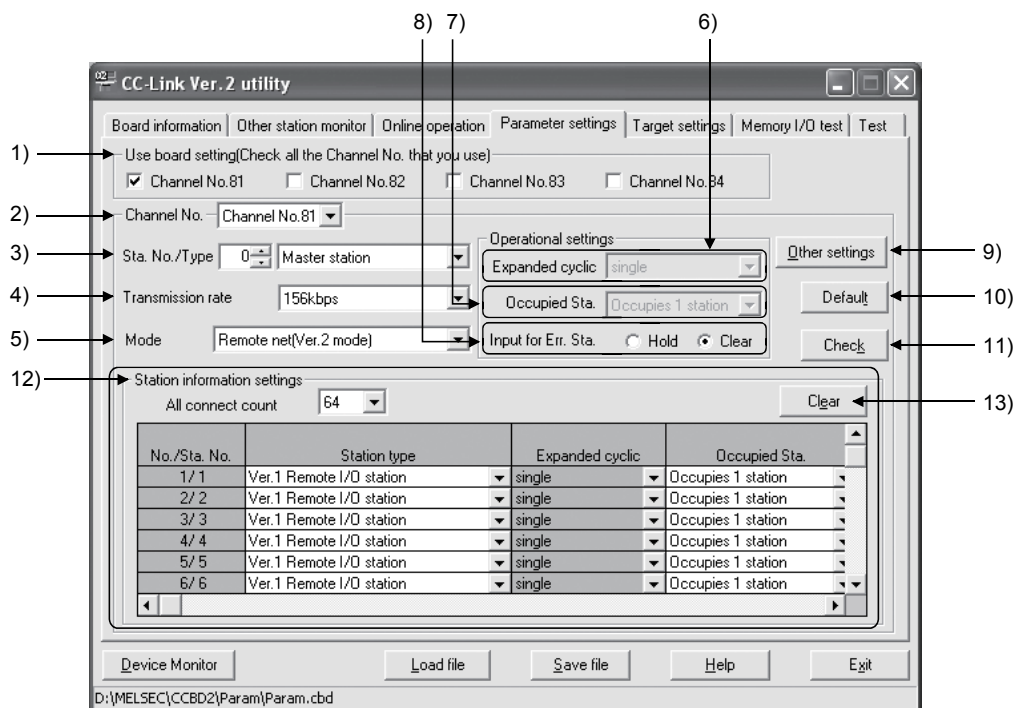
Item	Description
1) Use board setting	Select all channel No. of the CC-Link Ver.2 boards mounted on the PC.
2) Channel No.	Select the CC-Link Ver.2 board for which parameters are to be set.
3) Sta. No./Type	Set the station No. and station type.
4) Transmission rate	Set the transmission rate.
5) Mode	Set the operation mode.
6) Expanded cyclic	Make the expanded cyclic setting of the CC-Link Ver.2 board. This setting is allowed when "Sta. Type" is "Local station" and the mode is set to other than "Remote net Ver.1 mode".
7) Occupied Sta.	Set the occupied stations count for the CC-Link Ver.2 board (For local station only).
8) Input for Err. Sta.	Set how to handle input data in the event of a data link error.
9) [Other settings] button	Displays the Other settings screen.
10) [Default] button	Sets default values to the parameters. (Refer to table 6.1 in Section 6.1)
11) [Check] button	Checks the currently set parameters for any errors.
12) Station information settings	Set the total number of connected modules (All connect count) and station information of each module.
13) [Clear] button	Clears the parameters within the "Station information settings" area to the default values.

(2) Other settings screen
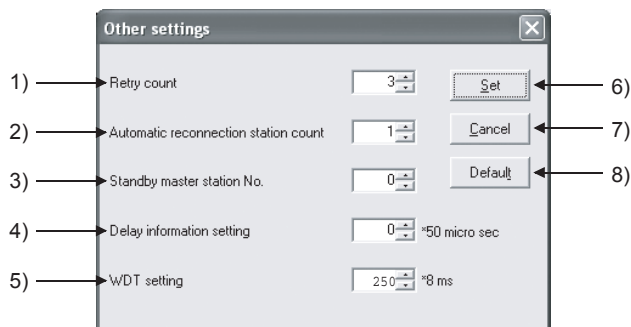
Item	Description
1) Retry count	Set the retry count for the case of a communication error (when a transient transmission error occurs).
2) Automatic reconnection station count	Set the number of modules that can be automatically returned in one link scan.
3) Standby master station No.	Set the station No. of the standby master station.
4) Delay information setting	Set 0 to "Delay information setting".
5) WDT setting	Set the monitoring time of the watchdog timer. (Unit: 8ms)
6) Set button	Saves the settings and closes the Other settings screen.
7) Cancel button	Closes the Other settings screen without saving the settings.
8) Default button	Set default values as parameters in the Other settings. (Refer to Table 6.1 in Section 6.1.)

POINT

For details of the parameter settings, refer to Chapter 6.

9.2.6 Operating the Target settings screen

Set the logical station number to access a multiple CPU system.
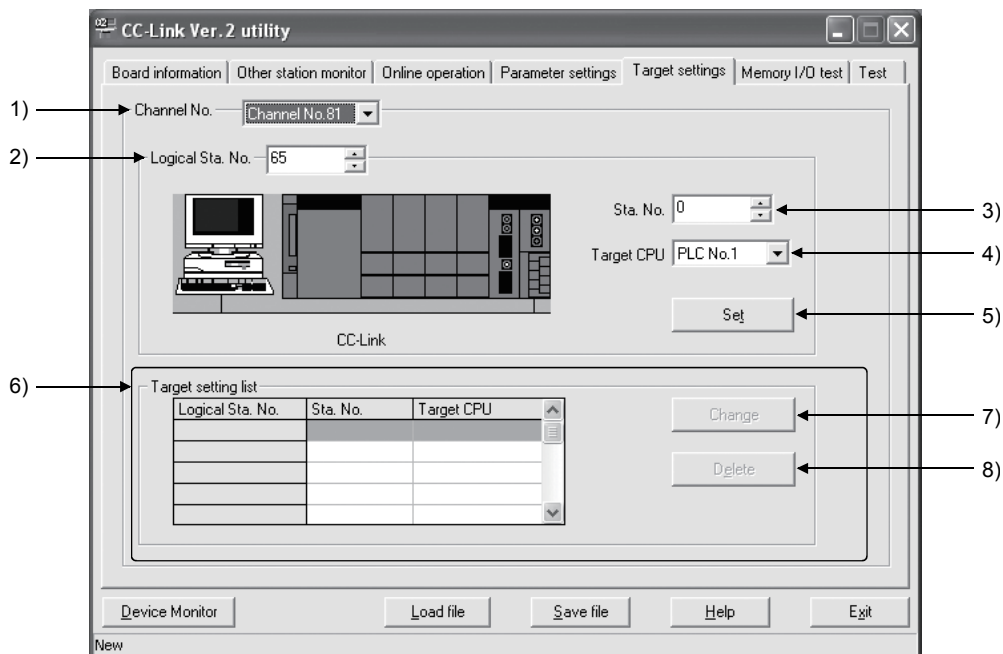
Item	Description
1) Channel No.	Select the channel for setting the Target.
2) Logical Sta. No.	Enter the logical station number to be set or modified. (Setting range: 65 to 239)
3) Sta. No.	Enter the station No. of the CC-Link module that is controlled by the multiple CPU system. (Setting range: 0 to 63)
4) Target CPU	Select the target multi-CPU to be accessed.
5) Set button	Registers the settings and/or their changes into the Target Setting List.
6) Target setting list	Displays the setting details of the selected target channel No. as a list.
7) Change button	Selecting the row to be changed in the Target Setting List and clicking this button changes the registered data. (Double-clicking the row makes the same result.)
8) Delete button	Select a row in the Target Setting List and clicking this button deletes the data of the registered logical station No.

9.2.7 Operating the Memory I/O test screen

The Memory I/O test screen diagnoses the dual-port memory and I/O port used by the CC-Link Ver.2 board.

```
┌─────────────────────────────────────────────────────────────┐
│  POINT                                                        │
├─────────────────────────────────────────────────────────────┤
│ (1)  Before starting a diagnostic operation, be sure to disconnect the external cable. │
│ (2)  To switch windows during a diagnostic operation, click the │ Stop │ button to │
│      stop the diagnosis and then switch screens.              │
└─────────────────────────────────────────────────────────────┘
```
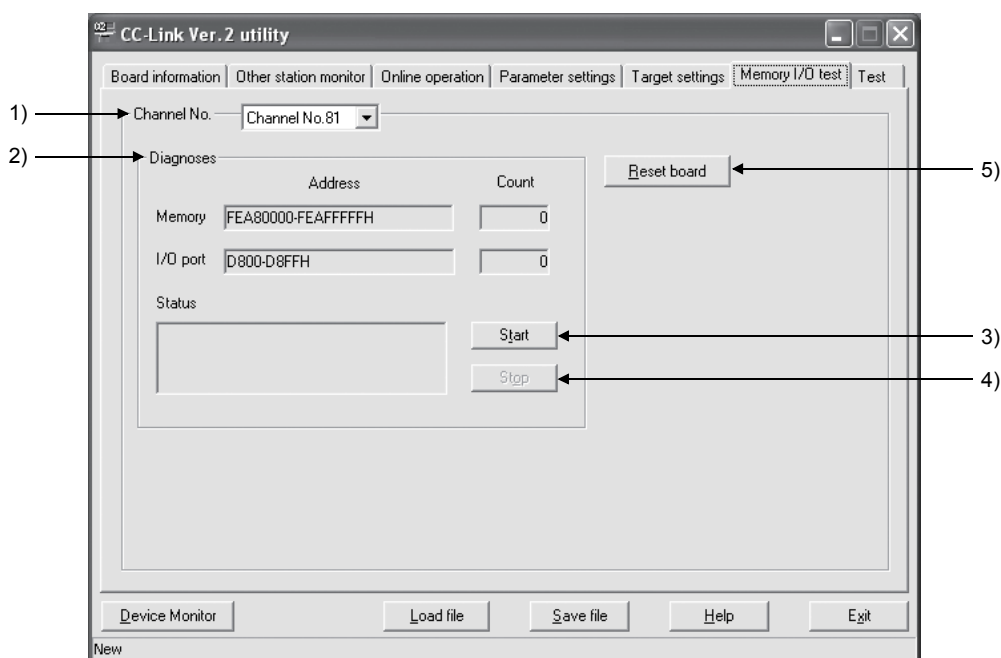

Item	Description
1) Channel No.	Select the channel to be diagnosed.
2) Diagnoses	Displays the addresses of the 2-port memory and I/O port being diagnosed, the number of diagnoses and the status.
3) Start button	Starts the 2-port memory and I/O port diagnosis on the selected channel.
4) Stop button	Stops the currently executing 2-port memory and I/O port diagnosis, and updates the count and status.
5) Reset board button	Resets the CC-Link Ver.2 board.

9.2.8 Operating the Test screen

The Test screen is used to test the installed CC-Link Ver.2 board.

POINT

(1) Depending on the station type and operation mode parameters written to the CC-Link Ver.2 board, test availability varies.
The following table shows each test can be selected or not.

O: Selectable ×: Not selectable

Test item / Station type / Mode	Master station		Other than master station	
	Other than offline	Offline	Other than offline	Offline
Hardware test	O	O	O	O
Line test (Hardware)	O	O	×	×
Line test (Software)	O	×	×	×
Network test	O	×	O	×

(2) When an error occurs in the Test, refer to the following items to check the error description and action to take.
  • Section 17.2.1, "Errors that may occur when executing functions"
  • Section 17.3.5, "Error codes stored in the special link registers"
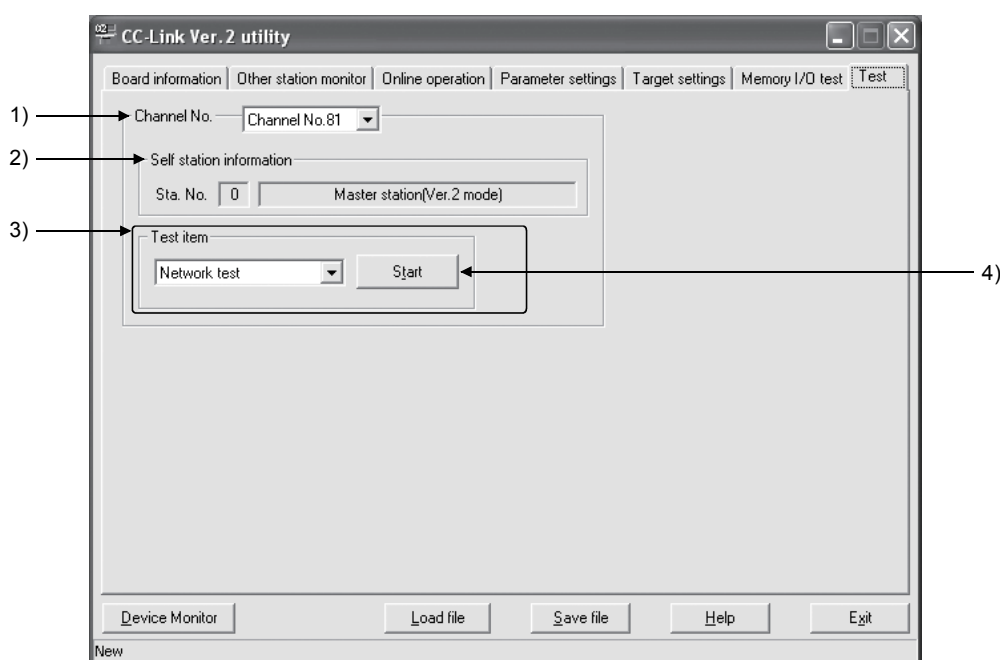
Item	Description
1) Channel No.	Sets the channel to be tested.
2) Self station information	Displays the station No., station type and operation mode of the selected channel.
3) Test item	Select the test to be executed. For details, refer to "(1) About tests".
4) ⬚ Start ⬚ button	Executes the selected test.

(1) About tests

The following describes each of the tests.

(a) Hardware test

This test is used to check the hardware operation before configuring the system or to check whether or not the CC-Link Ver.2 board is operating properly when the data link is not performed correctly.

POINT

(1) Before starting the hardware test, disconnect the CC-Link cable.
    Also, connect a terminating resistor between terminals DA and DB.
(2) The transmission rate during the hardware test execution is equal to the current parameter setting value.
(3) The CC-Link Ver.2 board is automatically reset before and after execution of the hardware test.
(4) WDT error message is registered to Event viewer to perform WDT test.

[Operation Procedure]

After selecting "Hardware test" in the Test item, click the [Start] button.
Test result will be displayed after hardware test execution.

Test result monitor (at normal completed)
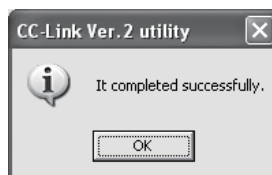
(b) Line test (Hardware)

For slave stations connected to the master station, this test is used to check whether or not all modules of station No.1 to 64 (All stations) or a specific module (Selected Station) is connected correctly with the CC-Link cable(s) and the data link is enabled.
This test is effective when the data link is not available due to an error, for example.

POINT

(1) Executing this test during data link stops the data link.
(2) Use "Selected Station" on the Line test screen for any of the error stations detected in the "All stations (1 to 64)" test.
(3) The CC-Link Ver.2 board is automatically reset before and after execution of the hardware test.
(4) Specifying "All stations (1 to 64)" with not all of 64 stations connected to the CC-Link system and executing this test will cause unconnected stations to be detected as error stations.

[Operation Procedure]
After selecting "Line test (Hardware)" in the Test item, click the [Start] button.
The line test screen appears.

Line test screen

1) → All stations(1-64)
2) → Selected station   1
3) → OK   Cancel ← 4)
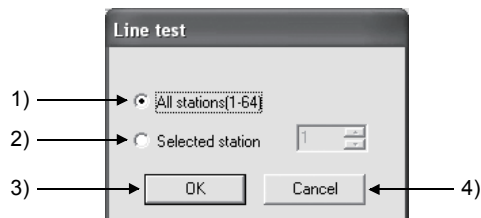
Item	Description
1) All stations (1 to 64)	Select this when performing the line test on all stations.
2) Selected station	Select this when performing the line test on a single station. (Setting range: 1 to 64)
3) OK button	Executes the test.
4) Cancel button	Cancels the test.

Line test result screen (For "All stations (1-64)" only)

5) → Each station information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

6) → Test result

☐ :Normal   It completed successfully.
               Error code : 0x0
■ :Error   OK ← 7)

(Display when 4 stations are connected.)

Item	Description
5) Each station information	Displays the information of each station. White: Normal station, Red: Error station
6) Test result	Displays the status of each station. In the event of an error, the error code is displayed.
7) OK button	Closes the line test result screen.

(c) Line test (Software)

This test is used to check the connection with all modules of station No. 1 to 64 (All stations) or a specific module (Selected station) with parameters set and the data link being performed.

> **POINT**
> (1) The Line test (Software) is executable only when the data link status of the CC-Link Ver.2 board is "In data link" or "During Auto-Returning."
> (2) Use "Station Specification" on the Circuit test screen for any of the error stations detected in the "All stations (1 to 64)" test.

[Operation Procedure]

After selecting "Line test (Software)" in the Test item, click the [Start] button. The line test screen appears.

Line test screen
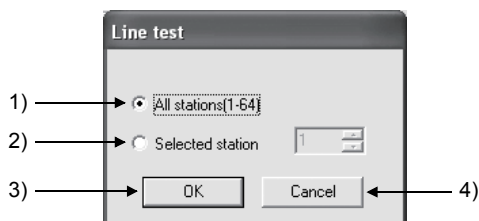
Item	Description
1) All stations (1-64)	Select this when performing the line test on all stations.
2) Selected station	Select this when performing the line test on a single station. (Setting range: 1 to 64)
3) OK button	Executes the test.
4) Cancel button	Cancels the test.

Line test result screen (For "All stations (1-64)" only)

(Display when 4 stations are connected.)

Item	Description
5) Each station information	Displays the information of each station. White: Normal station, Red: Error station
6) Test result	Displays the status of each station. In the event of an error, the error code is displayed.
7) OK button	Closes the line test result screen.

(d)   Network test
This is used to test the start or stop of the data link after connecting CC-Link cables or after establishing the data link.

> **POINT**
> (1) When the data link of the master station is stopped, the data link of the entire CC-Link system is stopped.
> (2) The Network test is executable only when the Data link status of the CC-Link Ver.2 board is "In data link", "Suspend data link" or "During Auto-Returning."

[Operation Procedure]
After selecting "Network test" in the Test item, click the [Start] button. The Network test screen appears.
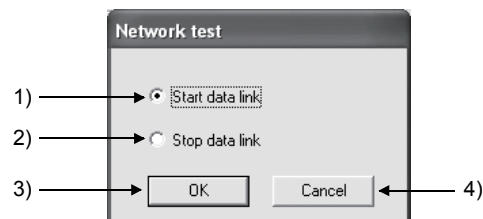
Item	Description
1) Start data link	Starts the data link.
2) Stop data link	Stops the data link.
3) OK button	Starts the test.
4) Cancel button	Cancels the test.

9.3 Device Monitor Utility

This section explains how to set up and operate the Device Monitor Utility.

> **POINT**
>
> In the Device Monitor Utility, the identical data are displayed for SB (link special relay) and SM (special relay) when accessing the own station.
> Also, the identical data are displayed for SW (link special register) and SD (special register).

9.3.1 Operating procedure

The following explains the operating procedure of the Device Monitor Utility.

```
            ┌──────────┐
            │  Start   │
            └────┬─────┘
                 │
     ┌───────────────────────────┐
     │ Click [Setting] - [Network │·········· Refer to Section 9.3.4.
     │ Setting], and set the      │
     │ channel to be used.        │
     └───────────┬───────────────┘
                 │
     ┌───────────────────────────┐
     │ Set the device to be       │·········· Refer to Section 9.3.5.
     │ monitored.                 │
     └───────────┬───────────────┘
                 │
     ┌───────────────────────────────────┐
     │ Monitor the device.               │
     │ ・Monitor the specified devices.   │·········· Refer to Section 9.3.2.
     │   (Batch monitoring)              │
     │ ・Monitor multiple devices at the  │·········· Refer to Section 9.3.3.
     │   same time.                      │
     │   (16-point entry monitoring)     │
     │ ・Change the specified device      │
     │   values                          │
     │     When word devices are         │·········· Refer to Section 9.3.6. and 9.3.7.
     │     specified                     │
     │     When bit devices are          │·········· Refer to Section 9.3.8.
     │     specified                     │
     │ ・Switch the display format during │·········· Refer to Section 9.3.9.
     │   monitoring.                     │
     │ ・Other operations                │·········· Refer to Section 9.3.10. and 9.3.11.
     └───────────┬───────────────────────┘
                 │
            ┌──────────┐
            │   End    │
            └──────────┘
```

9.3.2 Setting the batch monitoring

Set the Device Monitor Utility so that it monitors only a single designated device.

(1) Menu selection

Select [Menu] - [Batch monitoring] on the menu bar.
(Selectable for 16-point register monitor only.)

(2) Display screen

Item	Description
1) Device Information	Displays the current device status. To change the data format, refer to Section 9.3.9.
2) Network Status	Displays the status of the network that is currently set. To set up the network, refer to Section 9.3.4.
3) Data Format	Shows the data format and the type of the device being displayed (word device and bit device). To change the device type, refer to Section 9.3.5. To change the data format, refer to section 9.3.9.

9.3.3 Setting the 16-point register monitor

Set the Device Monitor Utility so that it monitors up to five bit devices and one word device simultaneously.

(1) Menu selection

Select [Menu] - [16- point register monitor] on the menu bar.
(Selectable for batch monitoring only.)

(2) Display screen

Item	Description
1) Device Information	Displays the current device status. To change the data format, refer to Section 9.3.9.
2) Network Status	Displays the status of the network that is currently set. To set up the network, refer to Section 9.3.4.
3) Data Format	Shows the data format and the type of the device being displayed (word device and bit device). To change the device type, refer to Section 9.3.5. To change the data format, refer to section 9.3.9.

9.3.4 Setting the monitoring destination

This section describes how to set up the network to be used when performing device monitoring.
The destination should be specified when starting the Device Monitor Utility.

(1) Menu selection

Select [Setting] - [Network Setting] on the menu bar.

(2) Dialog box
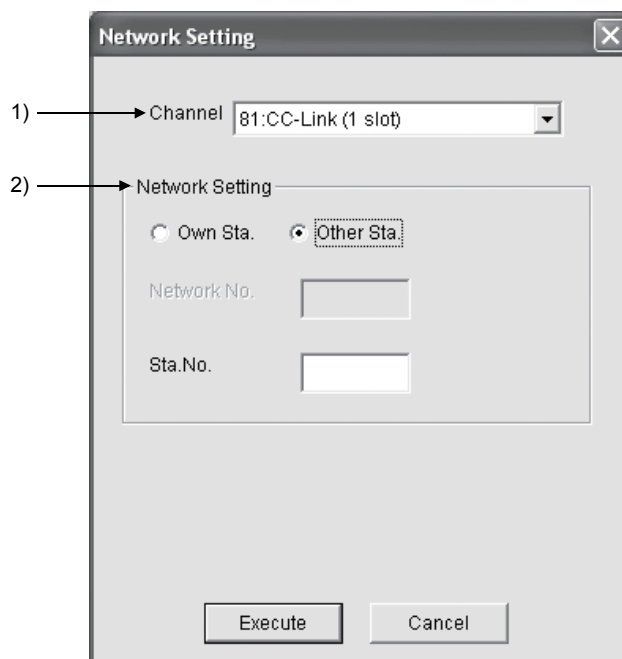
Item	Description
1) Channel	Set the channel to be used.
2) Network Setting	Set the own and other stations as well as the network number and station number.

> POINT
>
> (1) To access a multiple CPU system, select other station, then enter the value of the "logical station number" set with the CC-Link Ver.2 utility for the station number.
> (2) Do not designate a remote I/O station or an intelligent device station connected to the CC-Link as the monitor destination. If designated, an error will occur.
> (3) When own station is selected in the network setting, network No. "0" and station No. "255" are displayed as the network status.

9.3.5 Setting the device to be monitored

This section describes how to set up the device to be monitored.

(1) Menu selection
Select [Setting] - [Device setting] on the menu bar.

(2) Dialog box

For batch monitoring
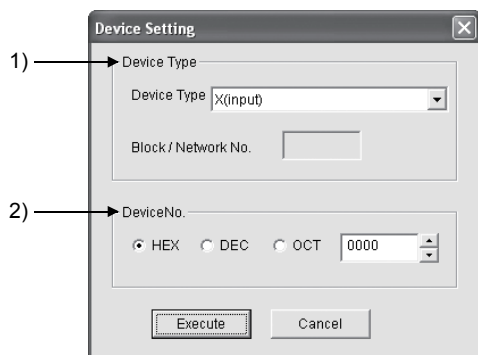
For 16-point entry monitoring

Item	Description
1) Device Type	Set the type and block/network number of the device to be monitored. To monitor the own station device of the CC-Link Ver.2 board, set as shown below: <table><tr><td>Own station device to be monitored</td><td>Device type to be designated</td></tr><tr><td>RX</td><td>X</td></tr><tr><td>RY</td><td>Y</td></tr><tr><td>SB</td><td>SM</td></tr><tr><td>SW</td><td>SD</td></tr><tr><td>RWw</td><td>Ww</td></tr><tr><td>RWr</td><td>Wr</td></tr><tr><td>Random access buffer</td><td>MRB</td></tr><tr><td>Buffer memory</td><td>SPB</td></tr></table>
2) Device No.	Set the head number of the device to be monitored. (HEX: Hexadecimal, DEC: Decimal, OCT: Octal)
3) Setting button	Registers the items set for Device Type and Device No., and then adds them to the Register Device List.
4) Register Device List	Displays a list of registered devices.
5) Change button	Selects the device to be changed. Click this button to change the registered data.
6) Delete button	Selects the device to be deleted. Click this button to delete the device from the Registered Device List.

> **POINT**
>
> The only devices that can be monitored by the 16-point entry monitoring are those that random access is performable. If any device that does not allow random access is designated, a device type error(-3) will occur. For whether or not each device allows random access, refer to Chapter 10, "Accessible Devices and Ranges."

9.3.6 Changing word device values

The designated word device data can be changed as follows:

(1) Menu selection

Select [Device Write] - [Data Changing] on the menu bar.
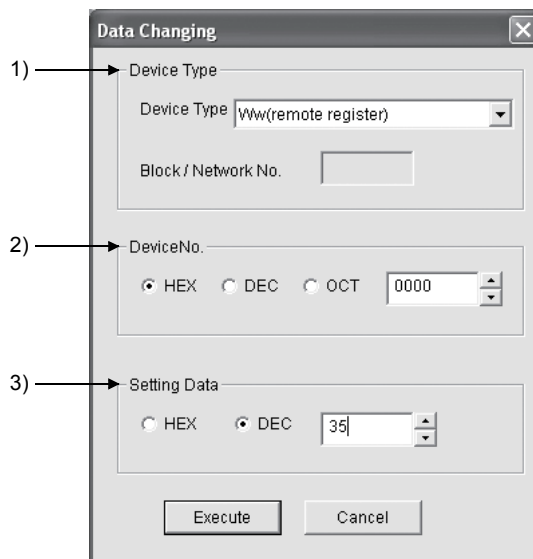
(2) Dialog box

Item	Description
1) Device Type	Sets the type and block/network number of the device for which data is to be changed.
2) Device No.	Sets the number of the device for which data is to be changed. (HEX: Hexadecimal, DEC: Decimal, OCT: Octal)
3) Setting Data	Sets the data to be changed. (HEX: Hexadecimal, DEC: Decimal)

⚠ WARNING • Configure an interlock circuit in a sequence program so that the entire system works safely at all times when controlling the data change to the programmable controller during operation.
Also, determine which corrective actions to take in the event of a data communication error between the personal computer and programmable controller CPU in use.

9.3.7 Changing word device values continuously

The set values are written to all of the specified word device areas at a time.

(1) Menu selection
   Select [Device Write] - [Continuous change in data] on the menu bar.

(2) Dialog box

Item	Description
1) Device Type	Set the type and block/network number of the device for which data is to be changed.
2) Device No.	Set the head address of the device number to change data. (HEX: Hexadecimal, DEC: Decimal, OCT: Octal)
3) Setting Data	Set the data to be continuously changed. (HEX: Hexadecimal, DEC: Decimal)
4) Points	Set the number of points to perform continuos change of data. (HEX: Hexadecimal, DEC: Decimal, OCT: Octal)

> ⚠ WARNING • Configure an interlock circuit in a sequence program so that the entire system works safely at all times when controlling the data change to the programmable controller during operation.
> Also, determine which corrective actions to take in the event of a data communication error between the personal computer and programmable controller CPU in use.

9.3.8 Switching a bit device on/off

The designated bit device can be switched on/off as follows:

(1) Menu selection
Select [Device Write] - [Bit device setting (resetting)] on the menu bar.

(2) Dialog box
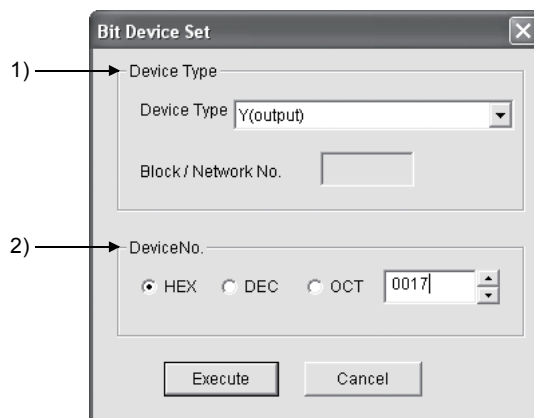
Item	Description
1) Device Type	Sets the type and block/network number of the bit device to be turned on/off.
2) Device No.	Sets the number of the bit device to be turned on/off. (HEX: Hexadecimal, DEC: Decimal, OCT: Octal)

⚠ WARNING • Configure an interlock circuit in a sequence program so that the entire system works safely at all times when controlling the data change to the programmable controller during operation.
Also, determine which corrective actions to take in the event of a data communication error between the personal computer and programmable controller CPU in use.

9.3.9 Switching the data format

The device monitoring display can be changed to the selected data format.
The batch monitoring and 16-point entry monitoring have different sets of selectable menus.

(1) Menu selection
Select [Data Format] - [Word (Bit) Device] on the menu bar.

9.3.10 Numerical pad

The Numerical Pad can be used to set device values and other numeric values. To display the Numerical Pad, select [Options] - [Numerical Pad] on the menu bar.

1. Click the numeric value input field.
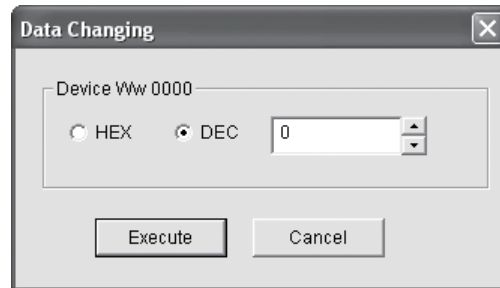
2. The Numerical Pad is displayed. Enter a desired value by pressing the corresponding buttons, and then click the OK button.
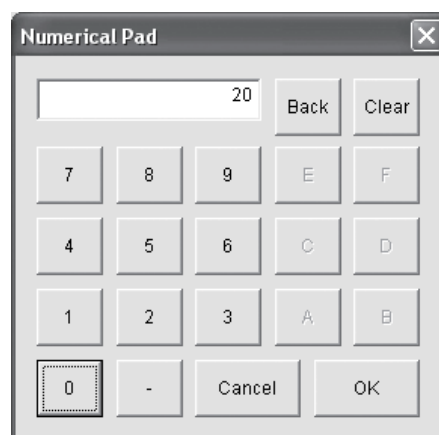
3. The value is entered in the system.
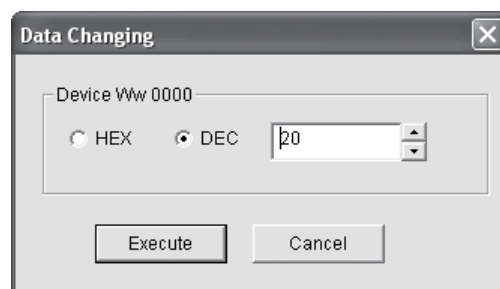
9.3.11 Other operations

By double-clicking a device number on the Device Monitor Utility window, the word device data can be changed or the bit device can be switched between on and off.

(1) Word device

The following explains how to change the word device.

1. Double-click the number of the word device to be changed.

Ww 0015	0	Ww 0025	
Ww 0016	0	Ww 0026	
Ww 0017	0	Ww 0027	
Ww 0018	0	Ww 0028	
Ww 0019	0	Ww 0029	
Ww 001A	0	Ww 002A	
Ww 001B	0	Ww 002B	

2. When the following Data Changing dialog box appears, set a desired value, and then click the ⎡ Execute ⎤ button.

```
Data Changing                            ✕
 ┌ Device Ww 0017 ──────────────────────┐
 │                                        │
 │   ○ HEX    ● DEC    123        ▲▼      │
 │                                        │
 └────────────────────────────────────────┘

       Execute            Cancel
```
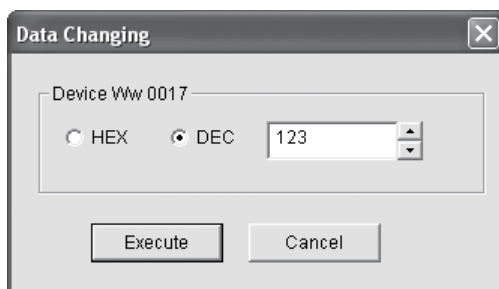
＊: When the display format is 32-bit, "Data changing (32-bit)" is displayed on the title.

3. Select ⎡ Yes ⎤ in the dialog box shown below to change the word device.

Select ⎡ No ⎤ to cancel the change operation.
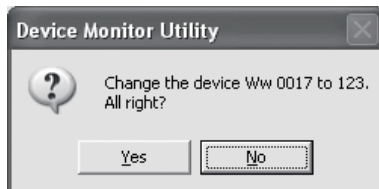
```
Device Monitor Utility                    ✕
  ?    Change the device Ww 0017 to 123.
       All right?

       Yes              No
```

⚠ WARNING • Configure an interlock circuit in a sequence program so that the entire system works safely at all times when controlling the data change to the programmable controller during operation.
Also, determine which corrective actions to take in the event of a data communication error between the personal computer and programmable controller CPU in use.

---

(2) Bit device

The following explains how to switch the bit device on/off.
Note that this operation is enabled only when the data format is [Vertical Indication].

1. Double-click the number of the bit device to be changed.

Y 0014	0	Y 0024
Y 0015	0	Y 0025
Y 0016	0	Y 0026
Y 0017	0	Y 0027
Y 0018	0	Y 0028
Y 0019	0	Y 0029
Y 001A	0	Y 002A
Y 001B	0	Y 002B

2. Select ☐ Yes ☐ in the dialog box shown below to change the bit device status.

Select ☐ No ☐ to cancel the change operation.
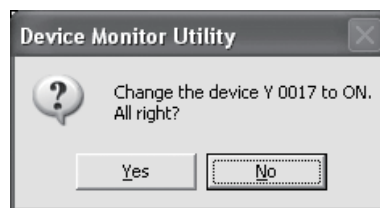
Device Monitor Utility

? Change the device Y 0017 to ON.
All right?

[Yes]   [No]

⚠ WARNING • Configure an interlock circuit in a sequence program so that the entire system works safely at all times when controlling the data change to the programmable controller during operation.
Also, determine which corrective actions to take in the event of a data communication error between the personal computer and programmable controller CPU in use.

MEMO

10 ACCESSIBLE DEVICES AND RANGES

This chapter explains the devices and ranges that can be accessed during CC-Link communication.

10.1 Accessible Devices

The following lists the devices that can be accessed during CC-Link communication.

POINT
The term "Batch" in the following tables indicates Batch Read (mdReceive) or Batch Write (mdSend); the term "Random" indicates Random Read (mdRandR), Random Write (mdRandW), Bit Set (mdDevSet), or Bit Reset (mdDevRst).

10.1.1 Own station (personal computer)

Device		Accessibility
X (RX)	Batch	○
	Random	
Y (RY)	Batch	○
	Random	
SB	Batch	○
	Random	
SW	Batch	○
	Random	
Ww (RWw)	Batch	○
	Random	
Wr (RWr)	Batch	○
	Random	
SPB (Own station buffer memory)	Batch	○
	Random	
MRB (Own station random access buffer)	Batch	○
	Random	

10.1.2 Other station

Device		Access destination								
		A1N	A0J2H A1S(H) A1SJ(H) A2C(J) A2N(-S1) A2S(H)	A2A(-S1) A2U(-S1) A2AS(-S1) A2USH-S1 Q02(H)-A Q06H-A	A3N A3A A3U	A4U	QnACPU	QCPU (Q mode)	LCPU	Personal computer
X	Batch	○	○	○	○	○	○			×
	Random									
Y	Batch	○	○	○	○	○	○			×
	Random									
L	Batch	○	○	○	○	○	○			×
	Random									
M	Batch	○	○	○	○	○	○			×
	Random									
Special M (SM), SB	Batch	○	○	○	○	○	○			×
	Random									
F	Batch	○	○	○	○	○	○			×
	Random									
T (contact)	Batch	○	○	○	○	○	○			×
	Random									
T (coil)	Batch	○	○	○	○	○	○			×
	Random									
C (contact)	Batch	○	○	○	○	○	○			×
	Random									
C (coil)	Batch	○	○	○	○	○	○			×
	Random									
T (current value)	Batch	○	○	○	○	○	○			×
	Random									
C (current value)	Batch	○	○	○	○	○	○			×
	Random									
D	Batch	○	○	○	○	○	○			×
	Random									
Special D (SD), SW	Batch	○	○	○	○	○	○			×
	Random									
T (setting value main)	Batch	○	○	○	○	○	×			×
	Random	×	×	×	×	×				×
T (setting value sub 1)	Batch	×	×	○ *[1]	○	○	×			×
	Random			×	×	×				×
T (setting value sub 2)	Batch	×	×	×	×	○	×			×
	Random					×				×
T (setting value sub 3)	Batch	×	×	×	×	○	×			×
	Random					×				×

*1: Cannot be accessed with the A2ACPU(-S1).

10

Device		A1N	A0J2H A1S(H) A1SJ(H) A2C(J) A2N(-S1) A2S(H)	A2A(-S1) A2U(-S1) A2AS(-S1) A2USH-S1 Q02(H)-A Q06H-A	A3N A3A A3U	A4U	QnACPU	QCPU (Q mode)	LCPU	Personal computer
							Access destination			
C (setting value main)	Batch	○	○	○	○	○		×		×
	Random	×	×	×	×	×				
C (setting value sub 1)	Batch	×	×	○ *1	○	○		×		×
	Random			×	×	×				
C (setting value sub 2)	Batch	×	×	×	×	○		×		×
	Random					×				
C (setting value sub 3)	Batch	×	×	×	×	○		×		×
	Random					×				
A	Batch	○	○	○	○	○		×		×
	Random									
Z	Batch	○	○	○	○	○		○		×
	Random									
V (index register)	Batch	○	○	○	○	○		×		×
	Random									
R (file register)	Batch	×	○	○	○	○		○ *2		×
	Random									
ZR (file register)	Batch	×	×	×	×	×		○ *2		×
	Random									
ER (extended file resister)	Batch	×	○	○	○	○		○ *2		×
	Random									
B	Batch	○	○	○	○	○		○		×
	Random									
W	Batch	○	○	○	○	○		○		×
	Random									
Q/QnA link special relay (on Q/QnACPU)	Batch	×	×	×	×	×		○		×
	Random									
Retentive timer (contact)	Batch	×	×	×	×	×		○		×
	Random									
Retentive timer (coil)	Batch	×	×	×	×	×		○		×
	Random									
Q/QnA link special register (on Q/QnACPU)	Batch	×	×	×	×	×		○		×
	Random									
Q/QnA edge relay (on Q/QnACPU)	Batch	×	×	×	×	×		○		×
	Random									
Own station random access buffer	Batch	×	×	×	×	×		×		×
	Random									
Retentive timer (current value)	Batch	×	×	×	×	×		○		×
	Random									
Own station link register (for sending)	Batch	×	×	×	×	×		×		×
	Random									
Own station link register (for receiving)	Batch	×	×	×	×	×		×		×
	Random									
S device of FXCPU	Batch	×	×	×	×	×		×		×
	Random									

∗1: Cannot be accessed with the A2ACPU(-S1).

∗2: Cannot be accessed with the Q00JCPU.

Device		A1N	A0J2H A1S(H) A1SJ(H) A2C(J) A2N(-S1) A2S(H)	A2A(-S1) A2U(-S1) A2AS(-S1) A2USH-S1 Q02(H)-A Q06H-A	A3N A3A A3U	A4U	QnACPU	QCPU (Q mode)	LCPU	Personal computer
Own station buffer memory	Batch	×	×	×	×	×		×		×
	Random									
Q/QnA SEND function (with arrival acknowledgment)	Batch	×	×	×	×	×		×		×
	Random									
Q/QnA SEND function (without arrival acknowledgment)	Batch	×	×	×	×	×		×		×
	Random									
Direct link input	Batch	×	×	×	×	×		○		×
	Random									
Direct link output	Batch	×	×	×	×	×		○		×
	Random									
Direct link relay	Batch	×	×	×	×	×		○		×
	Random									
Direct link register	Batch	×	×	×	×	×		○		×
	Random									
Direct link special relay (network module side)	Batch	×	×	×	×	×		○		×
	Random									
Direct link special register (network module side)	Batch	×	×	×	×	×		○		×
	Random									
Special direct buffer register	Batch	×	×	×	×	×		○		×
	Random									
Other station buffer memory *3	Batch	○	○	○	○	○		○		○
	Random	×	×	×	×	×		×		×
Other station random access buffer *3	Batch	○	○	○	○	○		○		○
	Random	×	×	×	×	×		×		×
Other station RX *3	Batch	○	○	○	○	○		○		○
	Random	×	×	×	×	×		×		×
Other station RY *3	Batch	○	○	○	○	○		○		○
	Random	×	×	×	×	×		×		×
Other station link register *3	Batch	○	○	○	○	○		○		○
	Random	×	×	×	×	×		×		×
Other station SB *3	Batch	○	○	○	○	○		○		○
	Random	×	×	×	×	×		×		×
Other station SW *3	Batch	○	○	○	○	○		○		○
	Random	×	×	×	×	×		×		×

*3: Accesses the buffer memory of the CC-Link module (intelligent device station) mounted to each CPU.
    Note that access is not allowed when logical station No. is used for the specification.

10.2 Accessible Ranges

Only the following can be accessed in the CC-Link communications: The master and local stations' programmable controllers and intelligent device stations on the CC-Link system to which the CC-Link Ver.2 board is linked, and PC/AT-compatible PCs with the CC-Link Ver.2 board.

11 MELSEC DATA LINK LIBRARY

This chapter explains an overview of the functions included in the MELSEC Data Link Library.

REMARK

The screens of Windows® 2000 are used in this section.
These screens are slightly different from other operating systems.

11.1 Overview of the MELSEC Data Link Library

The functions provided by the MELSEC Data Link Library are used when creating a user program that communicates with a programmable controller CPU. With these functions, the user can perform communications without worrying about the hardware type of the destination device or the communication protocol.

Communications with a designated programmable controller are easy without specific attention to the communication protocol.

IBM PC/AT compatible PC

MELSEC Data Link Library

CC-Link Ver.2 board

CC-Link

CC-Link module   CC-Link module
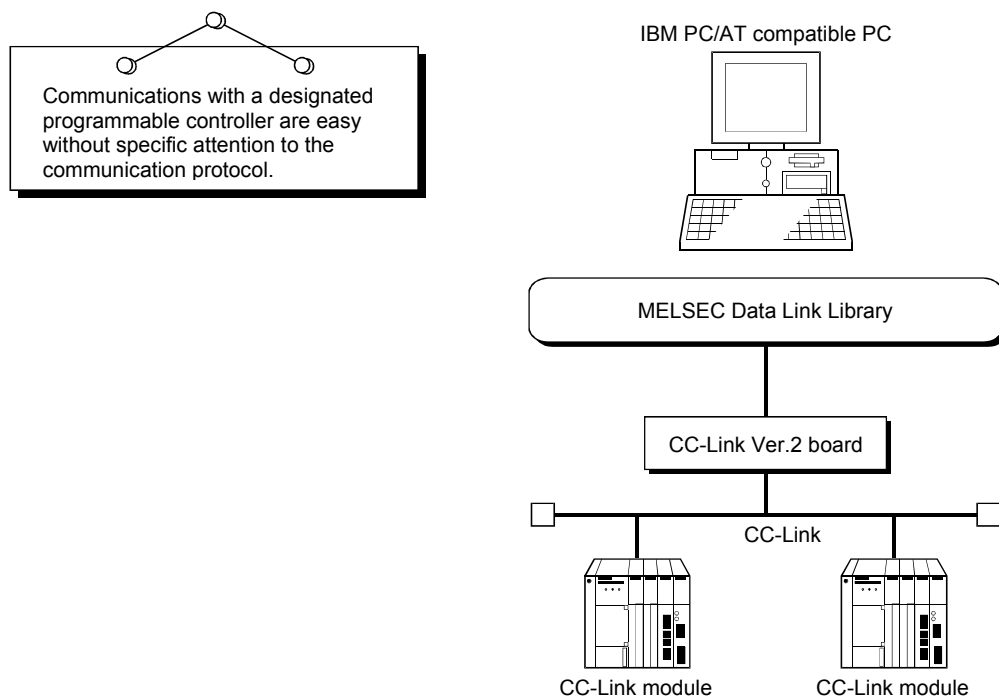
11.2 Function List

The following table lists the functions that are provided by the MELSEC Data Link Library that comes with the utility software.

Function name	Description
mdOpen	Opens a communication line.
mdClose	Closes a communication line.
mdSendEx	Batch writes devices. (Extended function)
mdReceiveEx	Batch reads devices. (Extended function)
mdRandWEx	Writes devices randomly. (Extended function)
mdRandREx	Reads devices randomly. (Extended function)
mdDevSetEx	Sets a bit device. (Extended function)
mdDevRstEx	Resets a bit device. (Extended function)
mdTypeRead	Reads the programmable controller CPU type.
mdControl	Remote RUN/STOP/PAUSE
mdInit	Refreshes the programmable controller device address.
mdBdRst	Resets the own board.
mdBdModSet	Sets the mode of the own board.
mdBdModRead	Reads the mode of the own board.
mdBdLedRead	Reads the LED information of the own board.
mdBdSwRead	Reads the switch status of the own board.
mdBdVerRead	Reads the version information of the own board.
mdSend	Performs batch write of devices.
mdReceive	Performs batch read of devices.
mdRandW	Writes to devices randomly.
mdRandR	Reads from devices randomly.
mdDevSet	Sets a bit device.
mdDevRst	Resets a bit device.

POINT

For details of the functions, refer to HELP for the MELSEC Data Link Functions provided with the utility software.

11.3 Settings for Using Functions

This section describes the setting operation in order to use functions.

POINT
For the combination of operating system and programming language, refer to the Microsoft technical information.

11.3.1 When using Visual Basic® 5.0 and Visual Basic® 6.0

The following describes the setting operation when using Visual Basic® 5.0 and Visual Basic® 6.0.
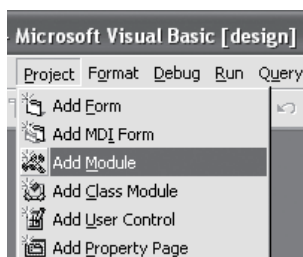
1. Start Visual Basic® 5.0 or Visual Basic® 6.0 and select [Project] - [Add Module] menu.

↓
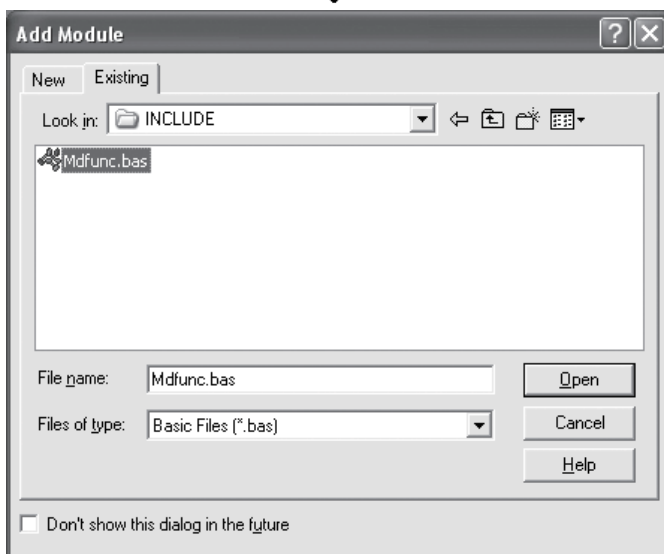
2. Select the "Existing" tab and select "MDFUNC.BAS."
   "MDFUNC.BAS" has been saved in the following directory during installation:
   <User-specified folder> - <COMMON> - <INCLUDE>

11.3.2 When using Visual C++® 5.0 and Visual C++® 6.0

The following describes the setting operation when using Visual C++® 5.0 and Visual C++® 6.0.

(1) When setting an include file

1. Start Visual C++® 5.0 or Visual C++® 6.0 and select [Tools] - [Options] menu.

↓
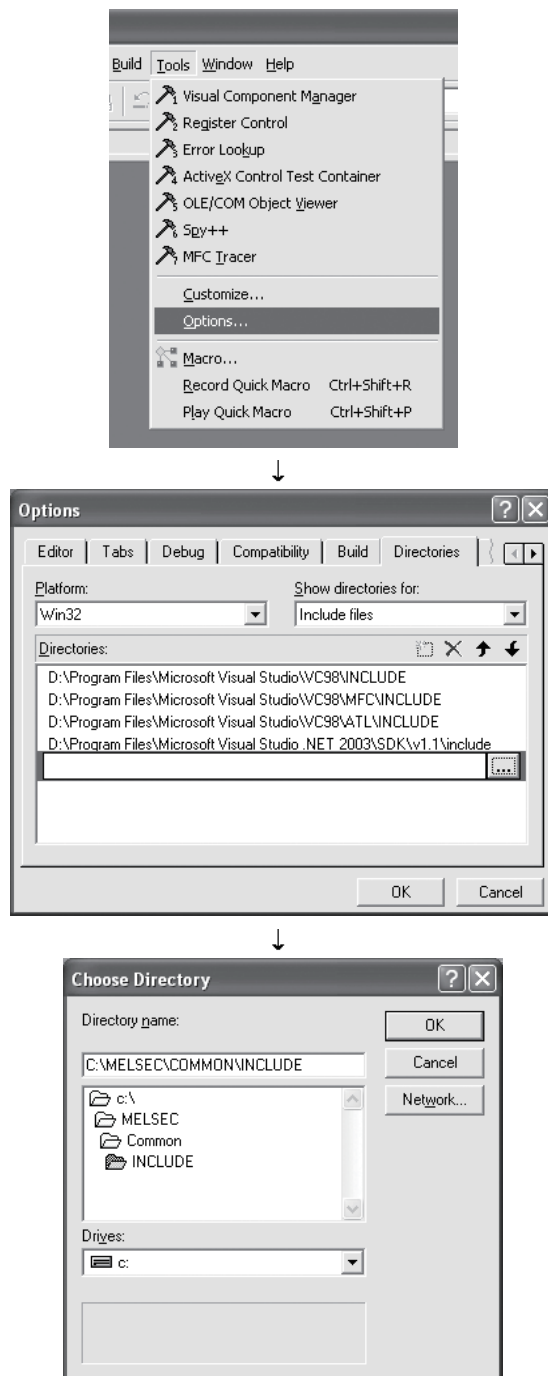
2. Select the "Directories" tab and set the directory type to "Include files."

↓

3. Double-click the item to be set and reference the folder containing the include file.
   MDFUNC.H has been saved in the following directory during installation:
   <User-specified folder> - <COMMON> - <INCLUDE>

4. Add "#include<mdfunc.h>" at the beginning of your program.

(2) When setting a library file

1. Start Visual C++® 5.0 or Visual C++® 6.0 and select [Tools] - [Options] menu.

↓
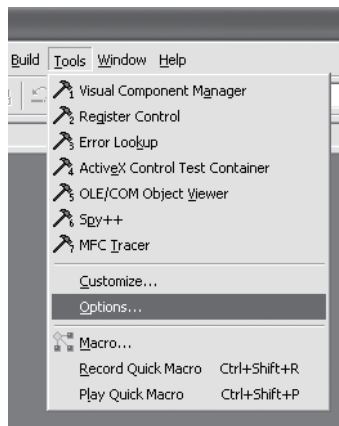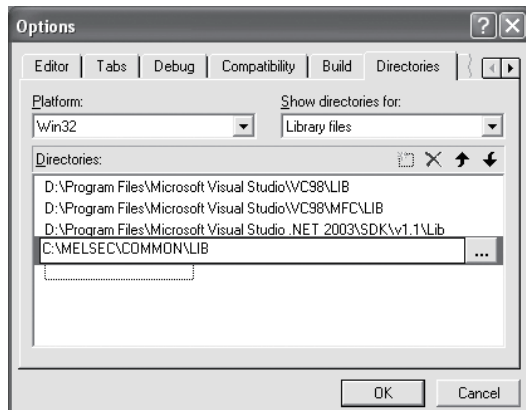
2. Select the "Directories" tab, set "Show directories for" to "Library files," and reference the folder containing the library file, as in step (1) above. "MDFUNC32.LIB" is stored in <User-specified folder>-<COMMON>-<LIB> during installation.

↓
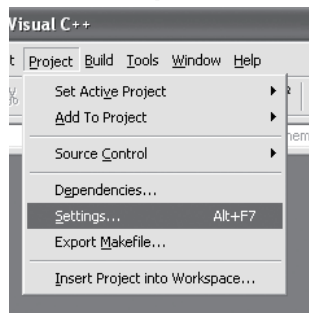
3. Open the workspace to create and select [Project] - [Settings] menu.

↓
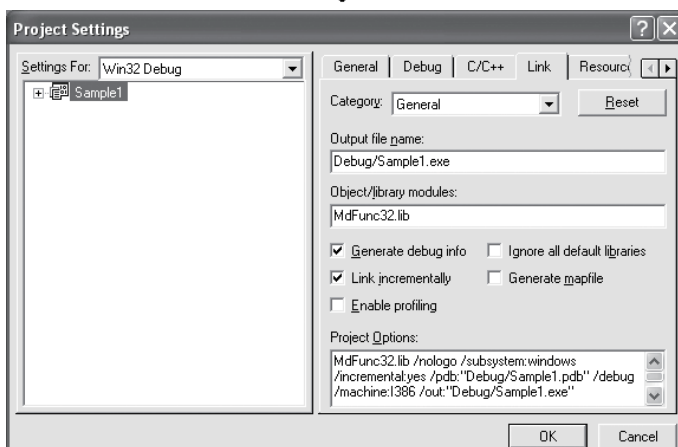
4. Select the "Link" tab, set "General" as the Category, then type "mdfunc32.lib" in the Object/library modules field.

11.3.3 When using Visual Basic® .NET 2003, 2005, 2008

The following describes the setting operation when using Visual Basic® .NET 2003, 2005, 2008.

REMARK

The screens of Visual Basic® .NET 2003 are used for the explanation in this section. These screens are slightly different from other Visual Basic® .
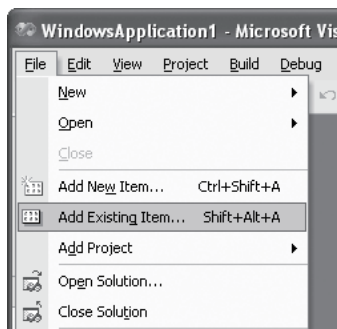
1. Start Visual Basic® .NET 2003, 2005, 2008 and select [File] – [Add Existing Item].

↓
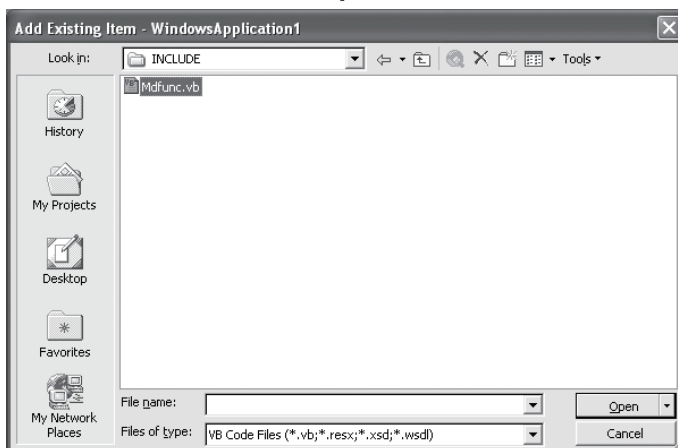
2. In the [Add Existing Item] dialog box, select "Mdfunc.vb".
   "Mdfunc.vb" has been saved in the following directory during installation:
   <User-specified folder> - <COMMON> - <INCLUDE>.

11.3.4 When using Visual C++® .NET 2003, 2005, 2008

The following describes the setting operation when using Visual C++® .NET 2003, 2005, 2008.

REMARK

The screens of Visual Basic® .NET 2003 are used for the explanation in this section.
These screens are slightly different from other Visual Basic® .

(1) When setting an include file
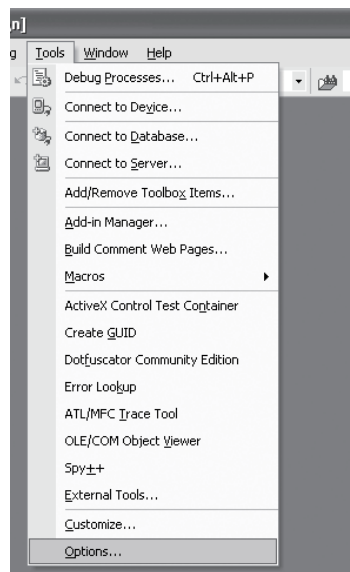
1. Start Visual C++® .NET 2003, 2005, 2008 and select [Tools] – [Options].

↓
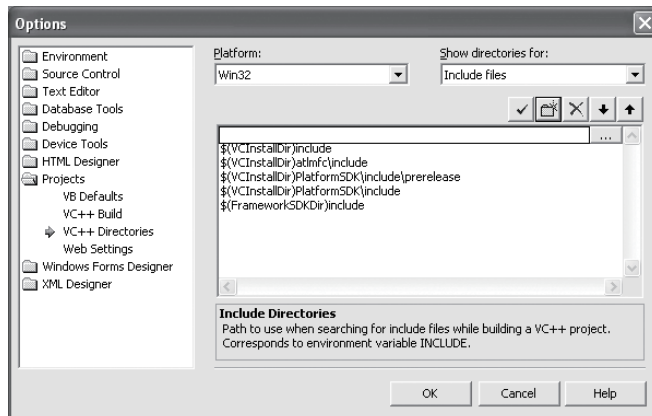
2. In the folder area of the Options dialog box, select <Projects> - "VC++ Directories".
   Set the directory type to "Include files" and click [ ].
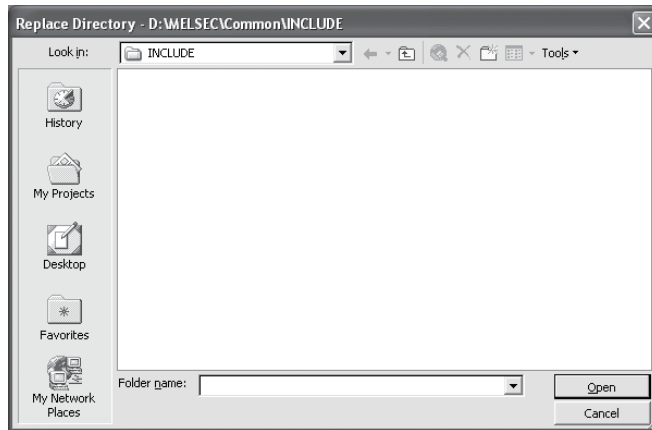
↓

3. Reference the folder containing the include file.
   "Mdfunc.h" has been saved in the following directory during installation:
   <User-specified folder> - <COMMON> - <INCLUDE>.

4. Add "#include<mdfunc.h>" at the beginning of your program.

(2) Library file setting
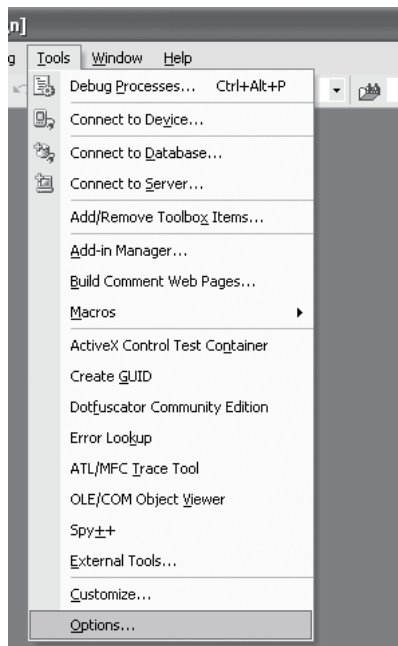
1. Start Visual C++® .NET 2003, 2005, 2008 and select [Tools] – [Options].

↓
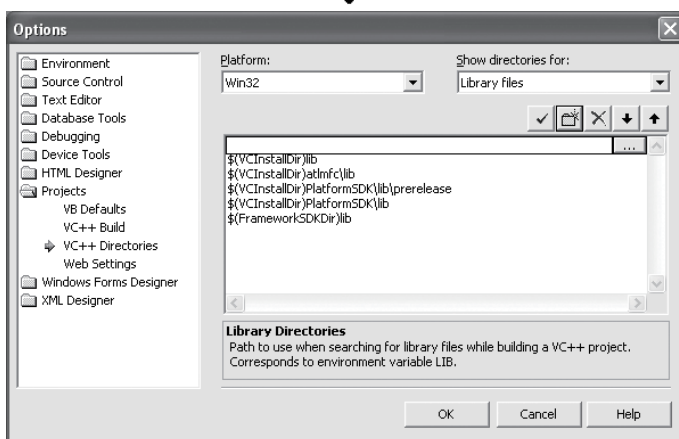
2. In the folder area of the Options dialog box,
For Visual C++® .NET 2003
select <Projects> - "VC++ Directories".
For Visual C++® 2005, 2008
select <Projects and Solutions> - "VC++ Directories".

Set the directory type to "Library files" and click .

↓

3. Reference the folder containing the library file.
"Mdfunc32.lib" has been saved in the following directory during installation:
<User-specified folder> - <COMMON> - <LIB>.

11.4 Programming Procedure

On a computer with the software package preinstalled, the programming procedure using the MELSEC Data Link Library is shown below.

```
┌─────────────────────────────────────────────────────────────┐
│ 1] Power on the IBM PC/AT compatible PC and start Windows®.   │
└─────────────────────────────────────────────────────────────┘
                            │
                      ╱─────────────╲                    YES
                 ╱ Has the utility been set up? ╲─────────────┐
                      ╲─────────────╱                         │
                            │ NO                              │
                            ▼                                 │
            ┌────────────────────────────────────┐           │
            │ 2] Perform utility setup.          │           │
            │  · Refer to Chapter 9 for the      │           │
            │    setup procedure.                │           │
            └────────────────────────────────────┘           │
                            │                                 │
       YES            ╱─────────────╲                         │
    ┌──────────── Change the settings? ╲◀───────────────────┘
    │                 ╲─────────────╱
    │                       │ NO
    │       ┌───────────────────────────────────────────────┐
    │       │ 3] Perform the setup required for the          │ ···· Refer to Section 11.3
    │       │    MELSEC Data Link Library.                   │
    │       └───────────────────────────────────────────────┘
```

4] Create a user program using the MELSEC Data Link Library.

Open the communication port. (mdOpen)

Use an appropriate function to access the own station or other stations.

NO — End the program?

YES

Close the port that was opened by the mdOpen function. (mdClose)

····· Refer to HELP for the MELSEC Data Link functions provided with the utility software.

5] Start the created user program.

6] Access the own station and other stations.

7] End the user program.

POINT

(1) Perform the processing for opening and closing a communication line (mdOpen /mdClose) only once at the beginning and end of a user program.
Repeatedly opening and closing a communication line for each transaction will degrade the communication performance.

(2) In order to access the own station and other stations again by the created user program, perform steps 5] to 7] only.

(3) The functions get detailed programmable controller information at the initial execution when the corresponding devices are added. Therefore, the initial function execution time gets longer than usual.

(4) When accessing multiple remote stations simultaneously from the same PC using the CC-Link Ver.2 utility, Device Monitor utility, user program or Mitsubishi's software package (such as MX Component), limit the number of stations to be accessed to 256 or less.
If 257 or more remote stations are accessed simultaneously, communication performance may deteriorate.

(5) When creating a user program for debugging using Visual C++® 6.0, do not define the buffer to be used by mdReceive in static.

(6) The mdClose function must be executed at the end process of the user program.
Ending the user program without executing the mdClose function may have effects on the user program which uses other MELSEC data link library, CC-Link Ver.2 utility, device monitor utility and Mitsubishi software packages (MX Component).

(7) The execution speed and the execution interval of the MELSEC data link function may be extended temporarily by Windows® processes or other applications. Create programs considering these conditions.

11.5 Channels

The MELSEC Data Link Library uses the following channels:

No.	Channel name	Description
81 to 84	CC-Link (1st to 4th boards)	These channels are used when communicating via the CC-Link Ver.2 board. They are set with the BD No. DIP switches on the back of the CC-Link Ver.2 board. The channels are set as follows according to the SW1 and SW2 settings: 81:Off, Off; 82: On, Off; 83: Off, On; 84: On, On

11.6 Station Number Settings

The following is a list of station numbers that are designated by the functions.

Communication	Station number designation
CC-Link	Own station: 255 (FF$_H$) Other station: *1, *2

*1:

Higher	Lower

Network No.
0: When CC-Link is used.

Station No. or group No.
0(0$_H$) to 63(3F$_H$), other station

<How to specify the logical station number>
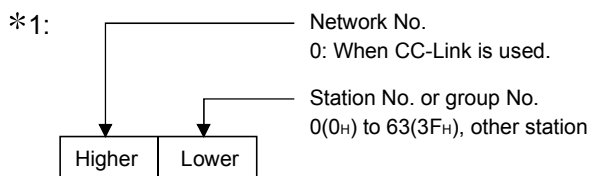
Set "0" to the upper byte (network No.) of the station number described above, then specify the logical station number to the lower byte (station number). The range of the logical station number specification is from 65(41$_H$) to 239(EF$_H$).

*2: Station number 64 cannot be designated in the CC-Link communication.

11.7 Network Number and Station Number Specification for Extended Functions

The following table shows the network numbers used for extended functions.

Communication	Network number specification
CC-Link	0 (Fixed)

The following table shows the station numbers used for extended functions.

Communication	Station number specification
CC-Link	Own station: 255 (FF$_H$) Other station: 0 (0$_H$) to 63 (3F$_H$)

11.8 Device Types

A device type can be specified in the functions either by a code number or device name.

(1) Device types when the CC-Link Ver.2 board is used

The following table shows the CC-Link dedicated device types when the CC-Link Ver.2 board is used to access devices.

Device type			Device
Code designation		Device name designation	
Decimal	Hexadecimal		
1	1H	DevX	Own station RX
2	2H	DevY	Own station RY
5	5H	DevSM	Own station SB (link special B for CC-Link)
14	EH	DevSD	Own station SW (link special W for CC-Link)
33	21H	DevMRB	Own station random access buffer
36	24H	DevWw	Own station link register (for sending)
37	25H	DevWr	Own station link register (for receiving)
50	32H	DevSPB	Own station buffer memory
-32768	8000H	DevRBM	Other station buffer memory [1]
-32736	8020H	DevRAB	Other station random access buffer [1]
-32735	8021H	DevRX	Other station RX [1]
-32734	8022H	DevRY	Other station RY [1]
-32732	8024H	DevRW	Other station link register [1]
-32669	8063H	DevSB	Other station SB (link special B for CC-Link) [1]
-32668	8064H	DevSW	Other SW (link special W for CC-Link) [1]

[1]: Cannot be used with the mdRandR, mdRandW, mdDevSet and mdDevRst functions.

POINT

To access a random access buffer, a different device type must be specified depending on the random access buffer setting.

Specify a device type shown in the following table, specify an address to the device No., then access the buffer.

Setting	Device type used	Accessible range
Default setting	DevMRB	A00H to FFFH
Extension setting	DevMRB	A00H to FFFH
	DevSPB	A00H to 2FFFH

---

(2) Common device types

The following table lists the device types common to all communication paths.

Device type			Device
Code designation		Device name designation	
Decimal	Hexadecimal		
1	1H	DevX	X
2	2H	DevY	Y
3	3H	DevL	L
4	4H	DevM	M
5	5H	DevSM	Special M (SM), SB (link special B for MELSECNET/10, MELSECNET/H and CC-Link)
6	6H	DevF	F
7	7H	DevTT	T (contact)
8	8H	DevTC	T (coil)
9	9H	DevCT	C (contact)
10	AH	DevCC	C (coil)
11	BH	DevTN	T (current value)
12	CH	DevCN	C (current value)
13	DH	DevD	D
14	EH	DevSD	Special D (SD), SW (link special W for MELSECNET/10, MELSECNET/H and CC-Link)
15	FH	DevTM	T (setting value main)
16	10H	DevTS	T (setting value sub 1)
16002	3E82H	DevTS2	T (setting value sub 2)
16003	3E83H	DevTS3	T (setting value sub 3)
17	11H	DevCM	C (setting value main)
18	12H	DevCS	C (setting value sub 1)
18002	4652H	DevCS2	C (setting value sub 2)
18003	4653H	DevCS3	C (setting value sub 3)
19	13H	DevA	A
20	14H	DevZ	Z
21	15H	DevV	V (index register)
22	16H	DevR	R (file register)
220	DCH	DevZR	ZR (file register)
22000 to 22256	55F0H to 56F0H	DevER0 to DevER256	ER (extension file register)
23	17H	DevB	B
24	18H	DevW	W
25	19H	DevQSB	Q/QnA link special relay (on Q/QnACPU)
26	1AH	DevSTT	Retentive timer (contact)
27	1BH	DevSTC	Retentive timer (coil)
28	1CH	DevQSW	Q/QnA link special register (on Q/QnACPU)
30	1EH	DevQV	Q/QnA edge relay (on Q/QnACPU)

Device type			Device
Code designation		Device name designation	
Decimal	Hexadecimal		
33	21H	DevMRB	Own station random access buffer *[1]
35	23H	DevSTN	Retentive timer (current value)
36	24H	DevWw	Own station link register (for send) *[1]
37	25H	DevWr	Own station link register (for receive) *[1]
50	32H	DevSPB	Own station buffer memory *[1]
101	65H	DevMAIL	Q/QnA SEND function (with arrival acknowledgment) and RECV function
102	66H	DevMAILNC	Q/QnA SEND function (without arrival acknowledgment)
1001 to 1255	3E9H to 4E7H	DevLX1 to DevLX255	Direct link input
2001 to 2255	7D1H to 8CFH	DevLY1 to DevLY255	Direct link output
23001 to 23255	59D9H to 5AD7H	DevLB1 to DevLB255	Direct link relay
24001 to 24255	5DC1H to 5EBFH	DevLW1 to DevLW255	Direct link register
25001 to 25255	61A9H to 62A7H	DevLSB1 to DevLSB255	Direct link special relay (network module side)
28001 to 28255	6D61H to 6E5FH	DevLSW1 to DevLSW255	Direct link special register (network module side)
29000 to 29255	7148H to 7247H	DevSPG0 to DevSPG255	Special direct buffer register
31000 to 31255	7918H to 7A17H	DevEM0 to DevEM255	EM (shared device) *[2]
32000 to 32255	7D00H to 7DFFH	DevED0 to DevED255	ED (shared device) *[2]

*1: Devices dedicated to buffer memory access on the CC-Link Ver.2 board (own station).

*2: Access is allowed only to a remote station's PC (only if the communication destination is a running MX Link (SW2D5F-CSKP-E or later) on Windows NT® .)

11.9 Sample Programs

When SW1DNC-CCBD2-B is installed in a PC, sample programs are registered in <User-specified folder>-<CCBD2>-<Sample>.
Sample programs are provided as a reference for creating user application programs.
The user is solely responsible for the use of the sample programs provided.

(1) MasterStation folder
This folder contains sample programs for the master board (these sample programs cannot be used for the local board).

(a) PositioningSystem folder

Folder name		Description	Programming language
VB		Sample program to perform the initialization, positioning, origin point return and JOG operation of the AJ65BT-D75P2-S3.	Visual Basic® 5.0, 6.0
VC	Initialize	Sample program to initialize the AJ65BT-D75P2-S3.	Visual C++® 5.0, 6.0 Visual C++® .NET 2003 Visual Studio 2005 Visual C++® Visual Studio 2008 Visual C++®
	JOG	Sample program to perform the JOG operation of the AJ65BT-D75P2-S3.	
	Positioning	Sample program to perform the positioning of the AJ65BT-D75P2-S3.	
	ZeroReturn	Sample program to perform the origin point return of the AJ65BT-D75P2-S3.	
NETVB	2003	Sample program for initialization, positioning, zero point return and jog operation of the AJ65BT-D75P2-S3.	Visual Basic® .NET 2003
	2005		Visual Studio 2005 Visual Basic® Visual Studio 2008 Visual Basic®

(b) R2 folder

Folder name		Description	Programming language
VB		Sample program to perform the initialization, transmission and reception of the AJ65BT-R2.	Visual Basic® 5.0, 6.0
VC	Rs2testB	Sample program to initialize the AJ65BT-R2.	Visual C++® 5.0, 6.0 Visual C++® .NET 2003 Visual Studio 2005 Visual C++® Visual Studio 2008 Visual C++®
	Rs2testR	Sample program to perform the reception of the AJ65BT-R2.	
	Rs2testS	Sample program to perform the transmission of the AJ65BT-R2.	
NETVB	2003	Sample program for the AJ65BT-R2 to perform initialization, transmission and reception.	Visual Basic® .NET 2003
	2005		Visual Studio 2005 Visual Basic® Visual Studio 2008 Visual Basic®

(c) RemoteDevice-68DAV-Ver.1/2 folder

Folder name		Description	Programming language
VB		Sample program to perform the digital/analog processing of the AJ65VBTCU-68DAV.	Visual Basic® 5.0, 6.0
VC			Visual C++® 5.0, 6.0 Visual C++® .NET 2003 Visual Studio 2005 Visual C++® Visual Studio 2008 Visual C++®
NETVB	2003		Visual Basic® .NET 2003
	2005		Visual Studio 2005 Visual Basic® Visual Studio 2008 Visual Basic®

(d) RemoteIO folder

Folder name		Description	Programming language
VB			Visual Basic® 5.0, 6.0
VC		Sample program to read/write the remote I/Os of the remote I/O station.	Visual C++® 5.0, 6.0 Visual C++® .NET 2003 Visual Studio 2005 Visual C++® Visual Studio 2008 Visual C++®
NETVB	2003		Visual Basic® .NET 2003
	2005		Visual Studio 2005 Visual Basic® Visual Studio 2008 Visual Basic®

(e) Datalink-Ver.1/2 folder

Folder name		Description	Programming language
VB			Visual Basic® 5.0, 6.0
VC		Sample program for communications between the master and local stations.	Visual C++® 5.0, 6.0 Visual C++® .NET 2003 Visual Studio 2005 Visual C++® Visual Studio 2008 Visual C++®
NETVB	2003		Visual Basic® .NET 2003
	2005		Visual Studio 2005 Visual Basic® Visual Studio 2008 Visual Basic®

(2) LocalStation folder

(a) Datalink-Ver.1/2 folder

Folder name		Description	Programming language
VB			Visual Basic® 5.0, 6.0
VC		Sample program for communications between the master and local stations.	Visual C++® 5.0, 6.0 Visual C++® .NET 2003 Visual Studio 2005 Visual C++® Visual Studio 2008 Visual C++®
NETVB	2003		Visual Basic® .NET 2003
	2005		Visual Studio 2005 Visual Basic® Visual Studio 2008 Visual Basic®

(3) MDFunction folder

(a) Vb folder (for Visual Basic® 5.0, 6.0)
A sample program for reading/writing D0 from/to the master station.

(b) Vc folder (for Visual C++® 5.0, 6.0, Visual C++® .NET 2003, 2005, 2008)

1) Mtest folder

File name	Description
Mtest1.c	Sample program of the general MELSEC data link library.
Netsmp1.c	Sample program to read device D of station number 0.

(c) NET folder (Visual Basic® .NET 2003, 2005, 2008)

1) 2003 folder
A sample program for reading/writing D0 from/to the master station.

2) 2005 folder
A sample program for reading/writing D0 from/to the master station.

12 COMMUNICATION BETWEEN THE MASTER STATION AND REMOTE I/O STATIONS

This section gives a system configuration example to explain the CC-Link Ver.2 board and remote I/O station setting, parameter setting, programming and operation check.

12.1 Configuring a System

In this example, a system consisting of a master station and two remote I/O stations as shown below is used.

Master station

IBM PC/AT
compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Remote I/O station (station No. 1)
AJ65SBTC1-32D1

Input module

Remote I/O station (station No. 2)
AJ65SBTC1-32T

Output module

Terminal resistor
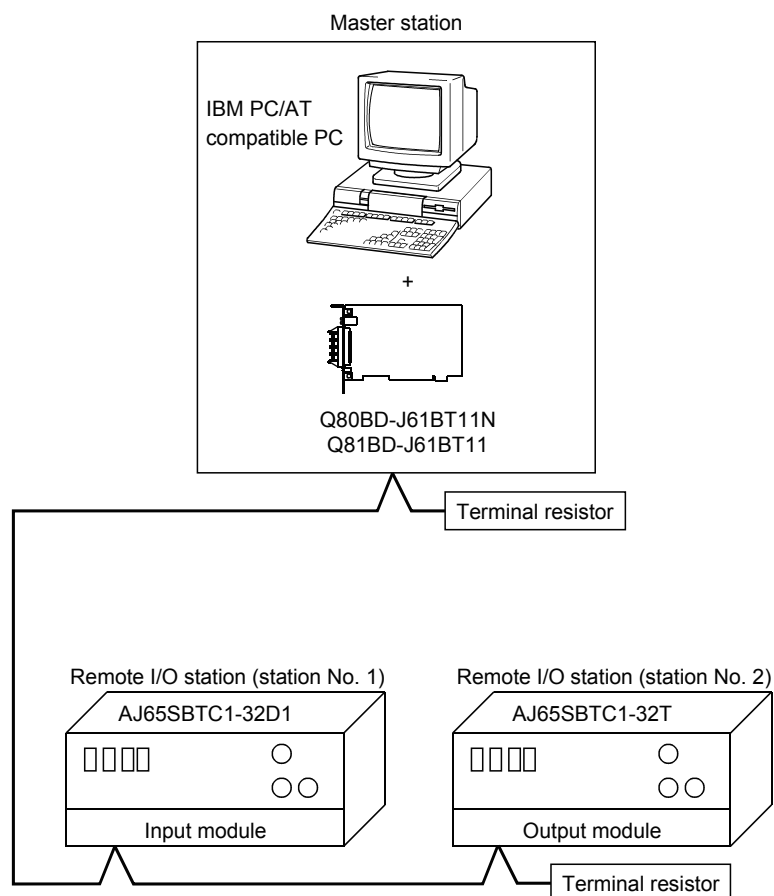
12.2 Setting up the master station

This section explains the master station setting.

12.2.1 Switch setting (channel No. setting)

The channel No. for the CC-Link Ver.2 board is set to 81 as an example in this section.

Channel No. setting switch

Switch No.	Setting
1	OFF
2	OFF
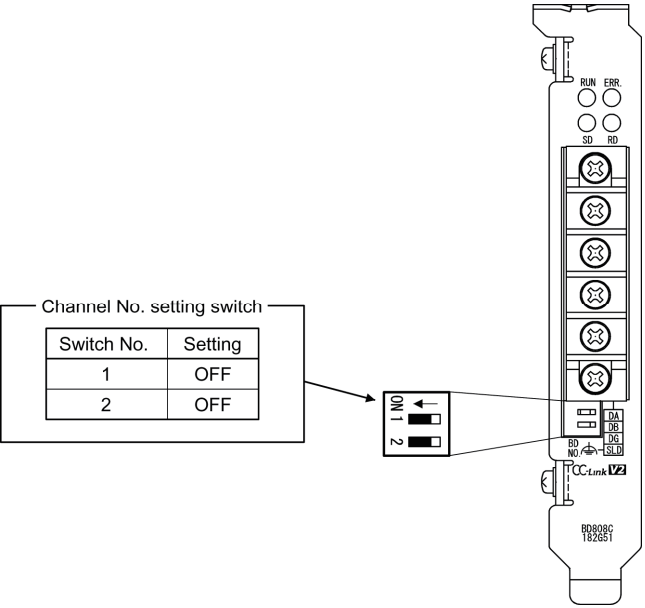
12.2.2 Parameter settings

The following shows the master station's parameter settings by the CC-Link Ver.2 Utility.

<Parameter settings screen>   <Other settings screen>
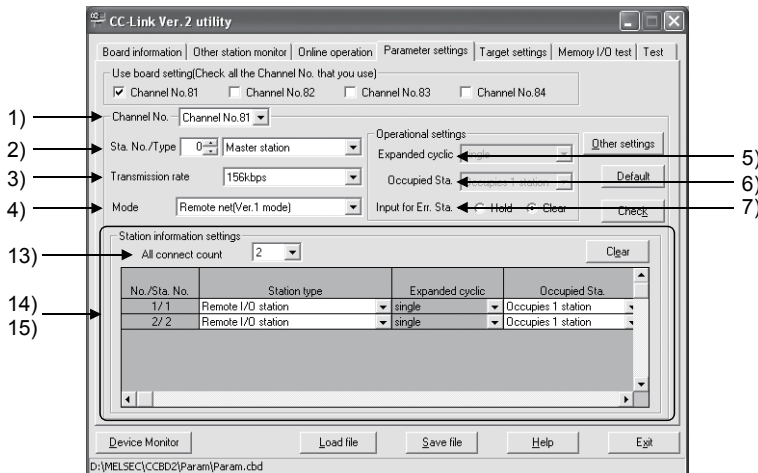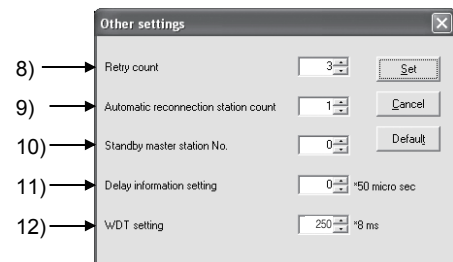
(1) Parameter settings

The following shows the parameter setting values. The parameter setting check list and the station information setting check list in Appendix can be used for the setting.

Table 12.1 Parameter Setting Check List

Setting item		Setting range/Item
1) Channel No.		Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84
2) Sta. No./Type	No.0	Master station / Local station / Standby master station
3) Transmission rate		156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps
4) Mode		Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line
Operational settings	5) Expanded cyclic	single / double / quadruple / octuple
	6) Occupied Sta.	Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations
	7) Input for Err. Sta.	Hold Clear
Other settings	8) Retry count	3 Times
	9) Automatic reconnection station count	1 Modules
	10) Standby master station No.	No.0
	11) Delay information setting	0 × 50 micro sec
	12) WDT setting	250 × 8 ms
Station information settings	13) All connect count	2 Modules

Table 12.2 Station Information Setting Check List

Sta. No.	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/invalid station select	Intelligent buffer select (word)		
						Send	Receive	Automatic
14) 1	Remote I/O station	single	Occupies 1 station	32 points	No setting			
15) 2	Remote I/O station	single	Occupies 1 station	32 points	No setting			
3								

12.3 Setting up the remote I/O stations

The settings of the remote I/O station switches are shown below:

Station No. setting switch

Module	Station No.	No. of tens			No. of units			
		40	20	10	8	4	2	1
AJ65SBTC1-32D1	1	OFF	OFF	OFF	OFF	OFF	OFF	ON
AJ65SBTC1-32T	2	OFF	OFF	OFF	OFF	OFF	ON	OFF

Transmission speed setting switch

0 (156 kbps)

Setting value	Setting switch status			Transmission speed
	4	2	1	
0	OFF	OFF	OFF	156 kbps
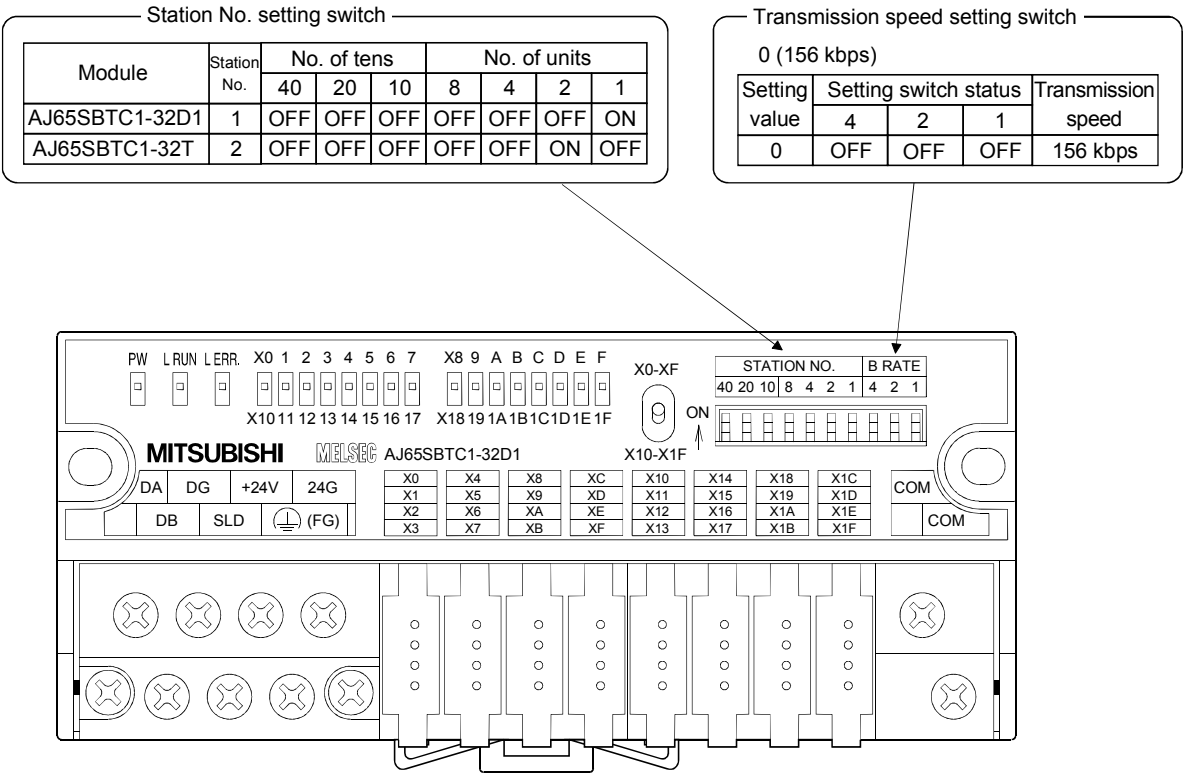
12.4 Creating a Program

This section explains how the created program reads data from the remote input (RX) and writes them to the remote output (RY) in communications with remote I/O stations. The following illustrates the relation between the remote I/O stations' I/O operations and the user program when controlling the remote I/O stations. (The shaded areas indicate the devices that are actually used.)

Master station (station No. 0)
IBM PC/AT compatible PC

＊1: When the remote net Ver.2 mode is selected, refer to the figure in Section 4.4.7(1).
     When the remote net additional mode is selected, refer to the figure in Section 4.4.7(2).

User Program	CC-Link Ver.2 Board
2) The remote input data (RX) of the CC-Link Ver.2 board are read out. Arguments to be set: Station No.=0xFF (own station) Device type=0x1 (own station RX) Device No. =0x0	1) The input data (X) of the remote I/O station are stored into the remote input (RX) on the CC-Link Ver.2 board by the link scan.
3) Data are written to the remote output (RY) of the CC-Link Ver.2 board. Arguments to be set: Station No.=0xFF (own station) Device type=0x2 (own station RY) Device No. =0x20	4) The remote output data (RY) of the CC-Link Ver.2 board are output to the remote I/O station.

12.5 Executing the Data Link

To start the data link, first power on the remote I/O stations, and then the master station.

12.5.1 Checking the data link status

The following describes how to check the operation status of the master station and remote I/O stations under normal data link condition.

(1) Checking the master station
Check the operation status of the master station.

(a) Checking by the LED indication on the CC-Link Ver.2 board
Make sure that the LED status is as follows:

:ON   :OFF

The CC-Link Ver.2 board is operating normally.
No error has occurred.
Data are being transmitted.
Data are being received.

(b) Checking by the CC-Link Ver.2 Utility
Check that the Board detail information of the CC-Link Ver.2 Utility is
displayed as shown below.

In data link: Normal data link is being performed.

Normal: The CC-Link Ver.2 board is operating normally.

ON (green): The CC-Link Ver.2 board is operating normally.
OFF: No error has occurred.

(2) Checking remote I/O stations.
Be sure that the LED display shows the following status:

AJ65SBTC1-32D1
AJ65SBTC1-32T

✹ : On   ○ : Off

PW   L RUN   L ERR.
✹   ✹   ○

24V DC is being supplied.

No error has occurred.

The data link is being executed normally.

12.5.2 Confirming the operation with a user program

Using a user program, confirm that the data link is being executed normally.
Use of the sample program allows the operation check in the following system
configuration. (For details on the location where the sample program is stored, refer to
Section 11.9.)
With the sample program, the following operations can be checked:

When the input X0 (RX0) in 1) is turned on, the output Y0 (RY20) in 2) turns on.
When the input X0 (RX0) in 1) is turned off, the output Y0 (RY20) in 2) turns off.

Master station

IBM PC/AT
compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Remote I/O station (station No. 1)   Remote I/O station (station No. 2)

AJ65SBTC1-32D1   AJ65SBTC1-32T

Input module   Output module

Terminal resistor

X00   ON
      1)

Y00   2)   ON
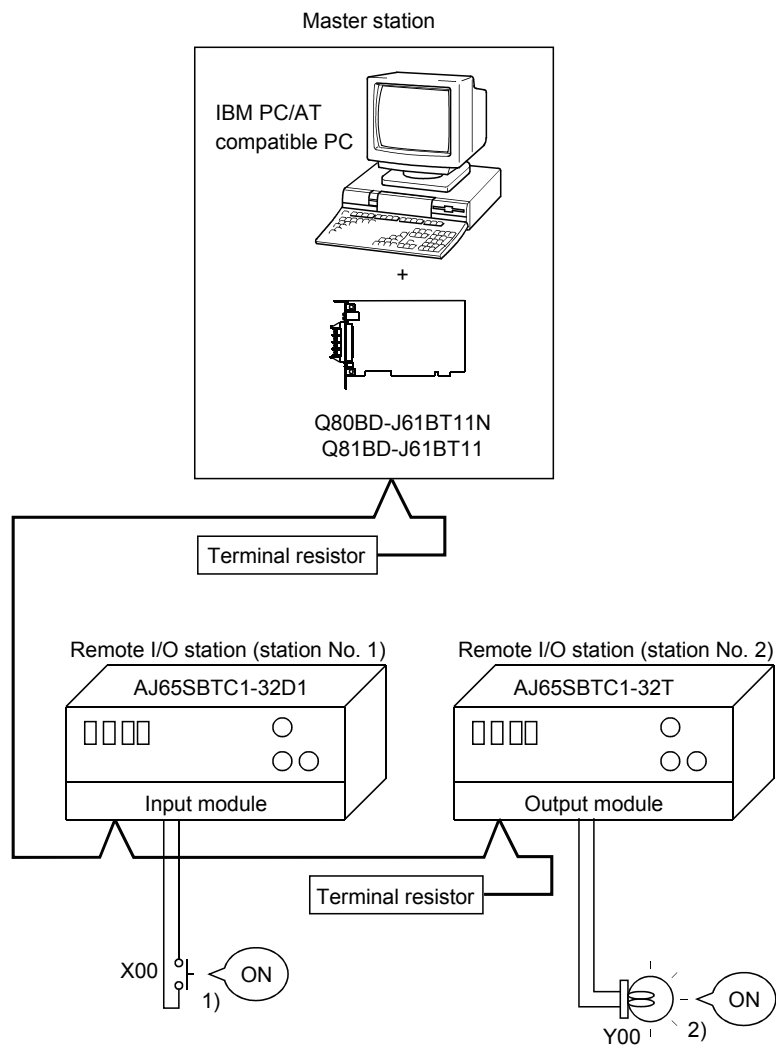
13 COMMUNICATION BETWEEN THE MASTER STATION AND REMOTE DEVICE STATION

This section gives a system configuration example to explain the CC-Link Ver.2 board and remote device station setting, parameter setting, programming and operation check.
For details on remote device stations, refer to the User's Manual for the remote device station.

13.1 When Using the Remote Net Ver.1 Mode

The following describes communications in the remote net Ver.1 mode.

13.1.1 Configuring a System

In this example, a system consisting of a master station and only one remote I/O station as shown below is used.
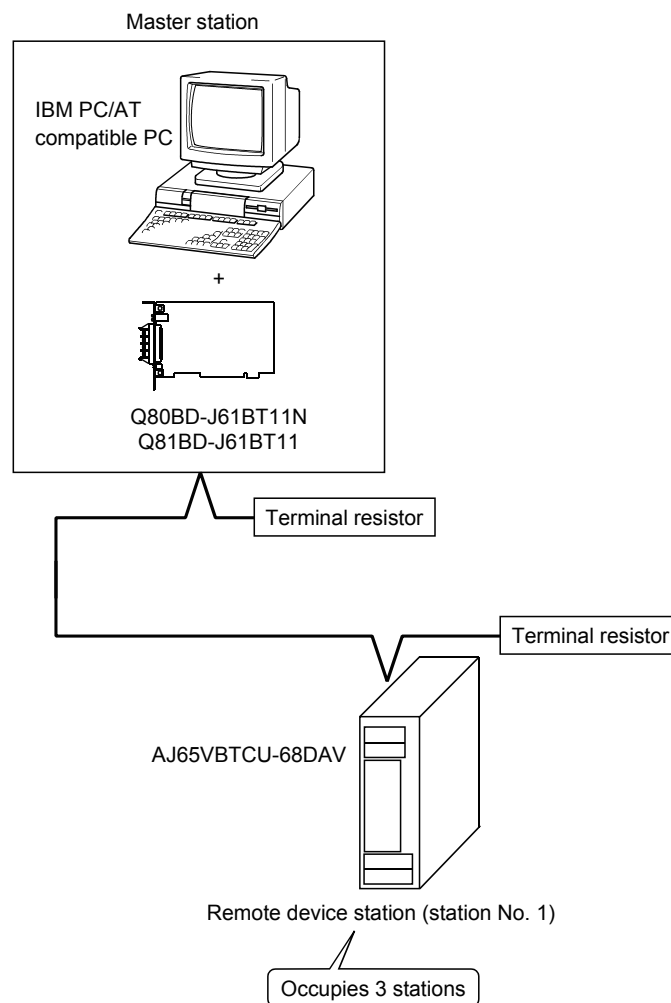
Master station

IBM PC/AT
compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Terminal resistor

AJ65VBTCU-68DAV

Remote device station (station No. 1)

Occupies 3 stations

13

13

13.1.2 Setting the master station

The following shows the master station setting.

(1) Switch setting (channel No. setting)
The channel No. for the CC-Link Ver.2 board is set to 81 as an example in this section.

Channel No. setting switch

Switch No.	Setting
1	OFF
2	OFF

(2) Parameter settings
      The following shows the master station's parameter settings by the CC-Link
      Ver.2 Utility.

<Parameter settings screen>   <Other settings screen>
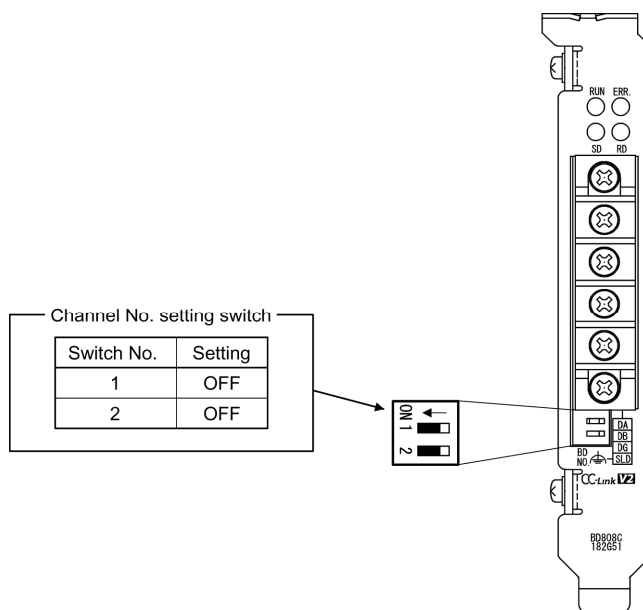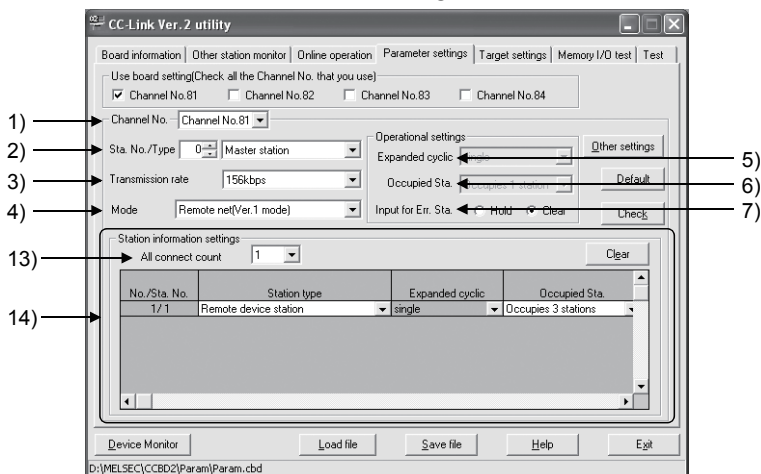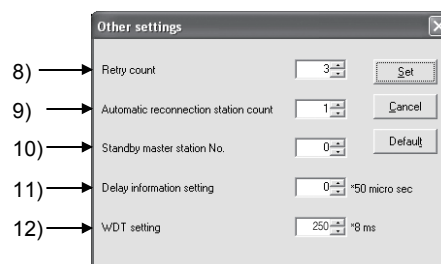
(a) Parameter settings
      The following shows the parameter setting values. The parameter setting
      check list and the station information setting check list in Appendix can be
      used for the setting.

Table 13.1 Parameter Setting Check List

Setting item			Setting range/Item
1) Channel No.			Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84
2) Sta. No./Type		No.0	Master station / Local station / Standby master station
3) Transmission rate			156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps
4) Mode			Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line
Operational settings	5)	Expanded cyclic	single / double / quadruple / octuple
	6)	Occupied Sta.	Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations
	7)	Input for Err. Sta.	Hold Clear
Other settings	8)	Retry count	3 Times
	9)	Automatic reconnection station count	1 Modules
	10)	Standby master station No.	No.0
	11)	Delay information setting	0 × 50 micro sec
	12)	WDT setting	250 × 8 ms
Station information settings	13)	All connect count	1 Modules

Table 13.2 Station Information Setting Check List

Sta. No.	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/invalid station select	Intelligent buffer select (word)		
						Send	Receive	Automatic
14) 1	Remote device station	single	Occupies 3 stations	96 points	No setting			
2								
3								

13.1.3 Setting up the remote device station

The following shows the remote device station's switch settings.

13.1.4 Creating a Program

Create the digital value setting program for performing the initial setting and outputting analog values for remote device stations.

The following illustrates the relation between the remote device station's I/O operations and the user program when controlling the remote device station, and how the digital value settings for the initial setting and analog outputs controls the system.
(The shaded areas indicate the devices that are actually used.)

∗: Default values are used for the initial settings except the analog output enable/disable setting.

Master station (station No. 0)
IBM PC/AT compatible PC

Remote device station (station No. 1)

User program

CC-Link Ver.2 board

Remote inputs (RX)

2) 8)	RX18	1) 7)	X18 (initial data processing request flag)
14) 18)	RX19	13) 17)	X19 (initial data setting completion flag)
18)	RX1B	17)	X1B (remote READY)

mdReceive

Remote outputs (RY)

mdSend

19)	RY00	12)	Y00 (CH1 analogue output enable flag)
5) 9)	RY18	6) 10)	Y18 (initial data processing completion flag)
11) 15)	RY19	12) 16)	Y19 (initial data setting request flag)

mdSend

Remote registers (RWw)

mdSend

| 19) | RWw0 | 20) | RWw0 (CH1 digital value setting area) |
| 3) | RWw8 | 4) | RWw8 (analogue output enable/disable setting area) |

mdSend

User Program	CC-Link Ver.2 Board
2) Reads out the initial data processing request flag (RX18). ◄—	1) Turns ON the initial data processing request flag (RX18) on the AJ65VBTCU-68DAV after turning on the AJ65VBTCU-68DAV.
3) With the initial data processing request flag (RX18) ON, writes data to the analog output enable/disable setting area (RWw8). —►	4) Writes data to the analog output enable/disable setting area (RWw8) on the AJ65VBTCU-68DAV.
5) Turns ON the initial data processing completion flag (RY18). —►	6) Turns ON the initial data processing completion flag (RY18) on the AJ65VBTCU-68DAV.
8) Reads out the initial data processing request flag (RX18). ◄—	7) The initial data processing request flag (RX18) is turned OFF on the AJ65VBTCU-68DAV.
9) With the initial data processing request flag (RX18) OFF, turns OFF the initial data processing completion flag (RY18). —►	10) Turns OFF the initial data processing completion flag (RY18) on the AJ65VBTCU-68DAV.
11) Turns ON the initial data setting request flag (RY19). —►	12) Turns ON the initial data setting request flag (RY19) on the AJ65VBTCU-68DAV.
14) Reads out the initial data setting completion flag (RX19). ◄—	13) The initial data setting completion flag (RX19) on the AJ65VBTCU-68DAV is turned ON.
15) With the initial data setting completion flag (RX19) ON, turns OFF the initial data setting request flag (RY19). —►	16) Turns OFF the initial data setting request flag (RY19) on the AJ65VBTCU-68DAV.
18) Reads out the initial data setting completion flag (RX19) and the remote READY (RX1B). ◄—	17) The initial data setting completion flag (RX19) on the AJ65VBTCU-68DAV is turned OFF, and the remote READY (RX1B) is turned ON.
19) With the initial data setting completion flag (RX19) OFF and the remote READY (RX1B) ON, perform the following: ·Writing digital values to the CH1 digital value setting area (RWw0). ·Turning ON the analog output enable flag (RY00) of the channel. —►	20) Writes digital values to the CH1 digital value setting area (RWw0) on the AJ65VBTCU-68DAV. Analog values are output from the AJ65VBTCU-68DAV.

13.1.5 Executing the data link

Turn ON the remote device stations and the master station in this order, and then start the data link.

(1) Checking the data link status

The following describes how to check the operation status of the master station and remote device stations under normal data link condition.

(a) Checking the master station

Check the status of the master station.

1) Checking by the LED indication on the CC-Link Ver.2 board

Make sure that the LED status is as follows:

●:ON   ○:OFF

The CC-Link Ver.2 board is operating normally.

Data are being transmitted.

No error has occurred.

Data are being received.

2) Checking by the CC-Link Ver.2 Utility

Check that the Board detail information of the CC-Link Ver.2 Utility is displayed as shown below.

In data link: Normal data link is being performed.

Normal: The CC-Link Ver.2 board is operating normally.

ON (green): The CC-Link Ver.2 board is operating normally.

OFF: No error has occurred.
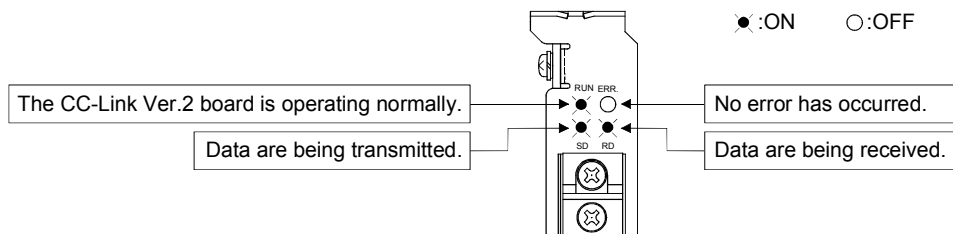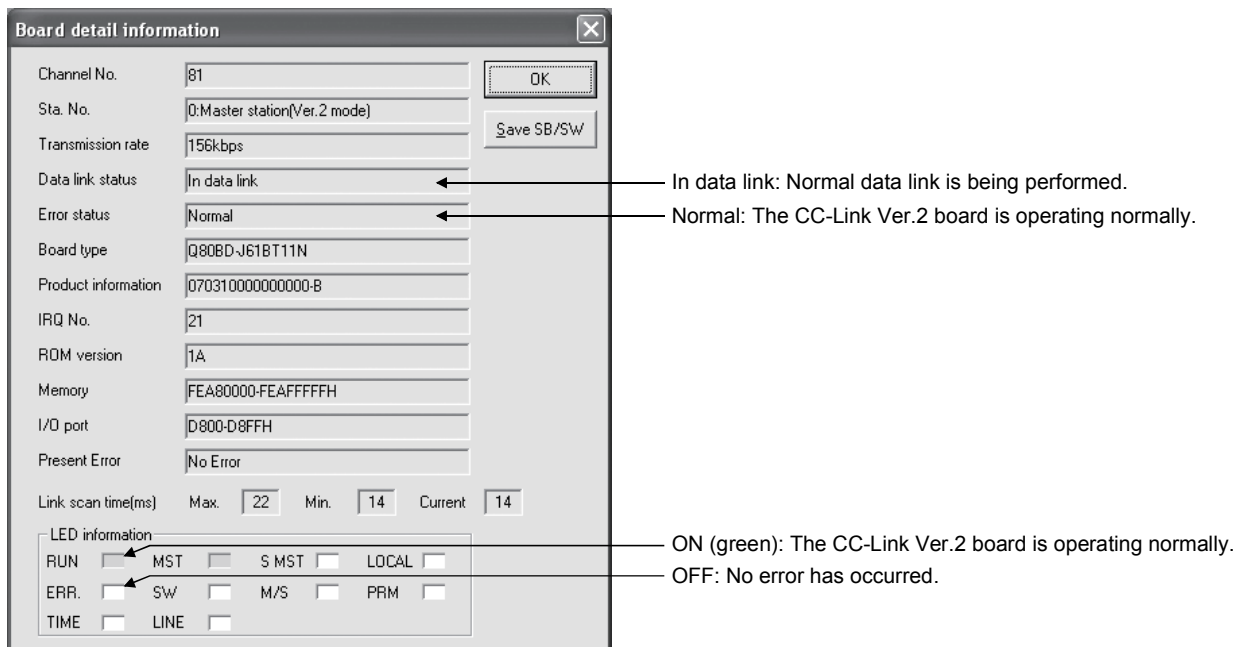
(b) Checking remote device stations
Check that the LED status are as shown below.
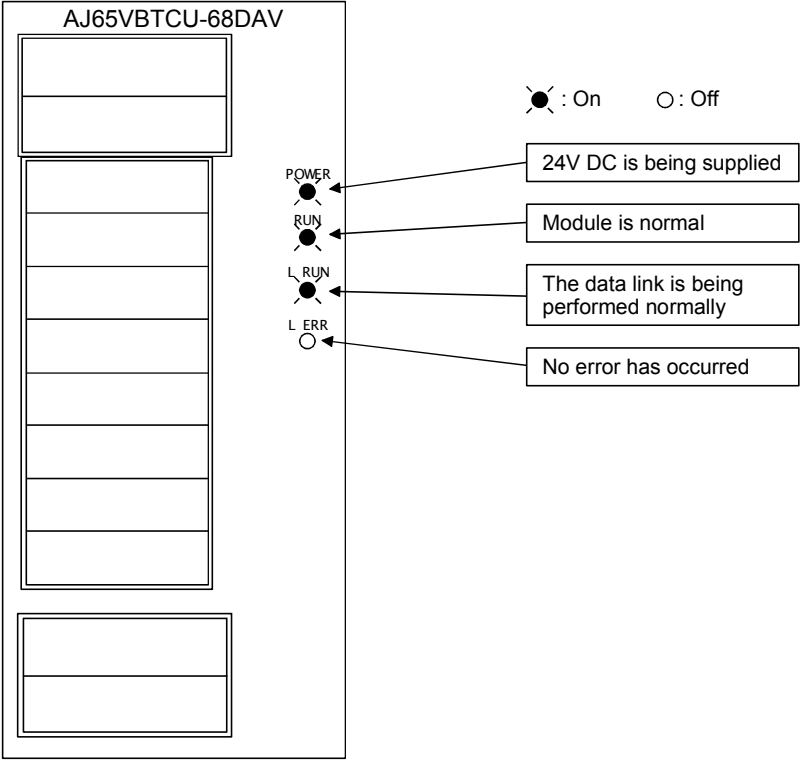
AJ65VBTCU-68DAV

● : On   ○ : Off

POWER — 24V DC is being supplied

RUN — Module is normal

L RUN — The data link is being performed normally

L ERR — No error has occurred

(2) Confirming the operation with a user program

With the user program, check whether digital values are being output to remote device stations through normal data link.

Use of the sample program allows the operation check in the following system configuration. (For the sample program, refer to Section 11.9.)

On the sample program, setting a digital value of "300" enables analog voltages to be output from remote device stations.

Analogue output of the AJ65VBTCU-68DAV

CH1 Digital output value

Digital value: 300

Master station

IBM PC/AT
compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Terminal resistor

AJ65VBTCU-68DAV

The analog value corresponding to the digital value of 300 is output.

Remote device station
(station No. 1)

Occupies 3 stations

Analog output
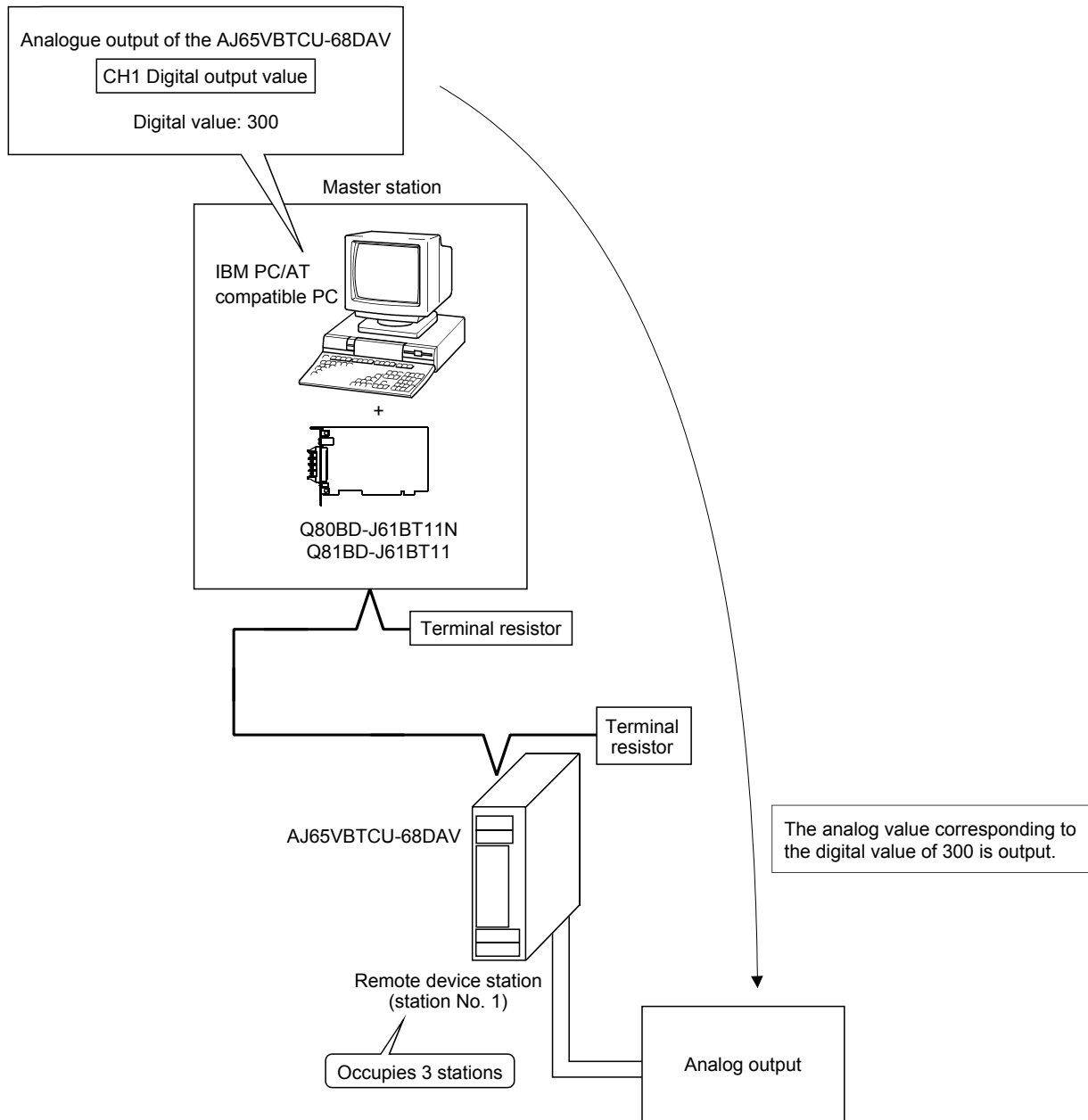
13.2 When Using the Remote Net Ver.2 Mode or Remote Net Additional Mode

The following describes communications in the remote net Ver.2 mode or in the remote net additional mode.

13.2.1 Configuring the system

In this system, 2 remote device stations shall be connected.
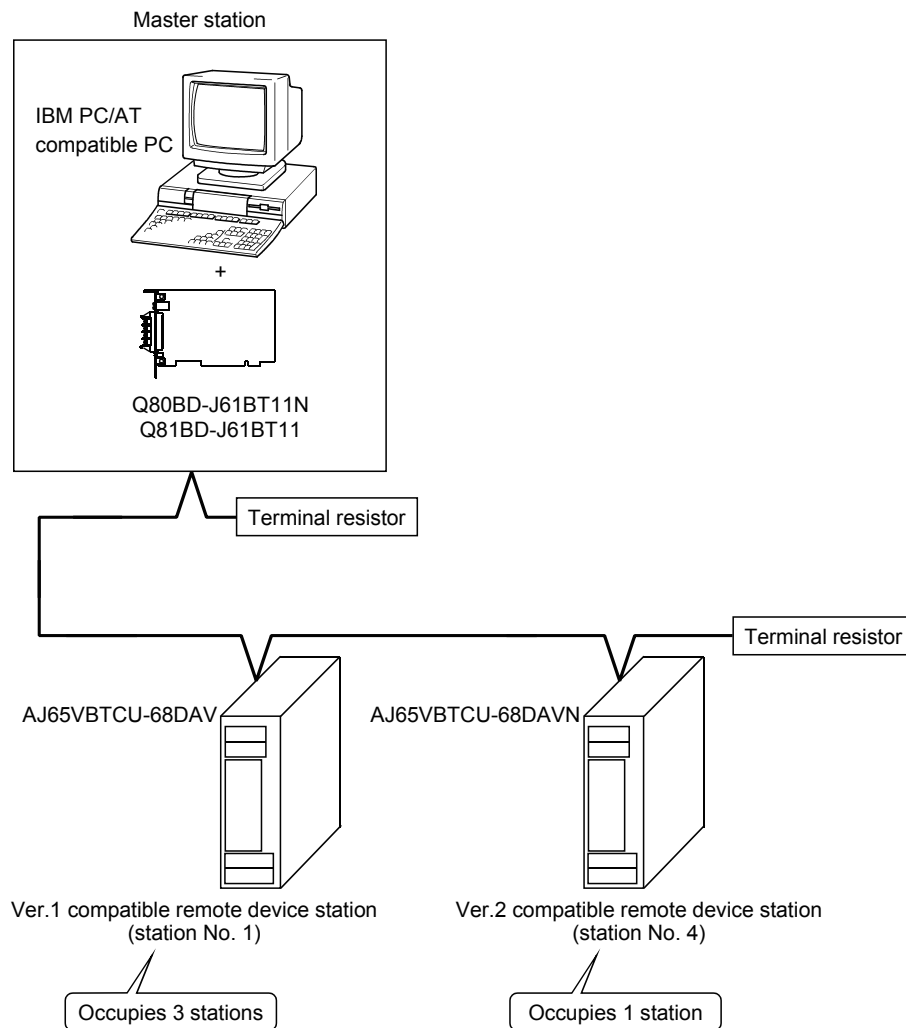
13.2.2 Setting the master station

The following shows the master station setting.

(1) Switch setting (channel No. setting)
The channel No. for the CC-Link Ver.2 board is set to 81 as an example in this section.

Channel No. setting switch

Switch No.	Setting
1	OFF
2	OFF

(2) Parameter settings
The following shows the master station's parameter settings by the CC-Link
Ver.2 Utility.

<Parameter settings screen>   <Other settings screen>
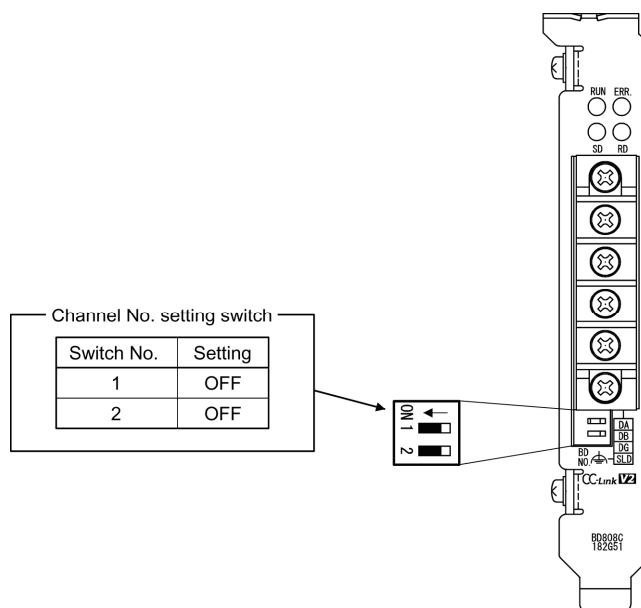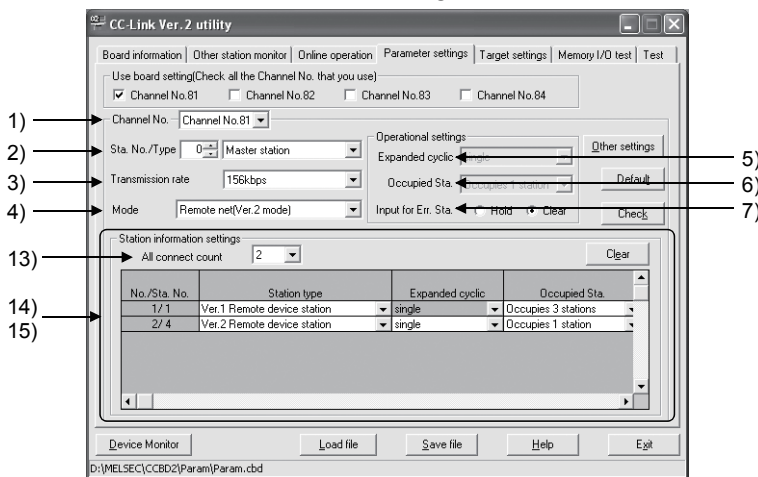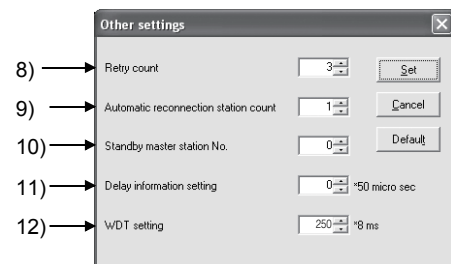
(a) Parameter settings
The following shows the parameter setting values. The parameter setting
check list and the station information setting check list in Appendix can be
used for the setting.

Table 13.3 Parameter Setting Check List

Setting item		Setting range/Item
1) Channel No.		Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84
2) Sta. No./Type	No.0	Master station / Local station / Standby master station
3) Transmission rate		156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps
4) Mode [1]		Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line
Operational settings	5) Expanded cyclic	single / double / quadruple / octuple
	6) Occupied Sta.	Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations
	7) Input for Err. Sta.	Hold / Clear
Other settings	8) Retry count	3 Times
	9) Automatic reconnection station count	1 Modules
	10) Standby master station No.	No.0
	11) Delay information setting	0 × 50 micro sec
	12) WDT setting	250 × 8 ms
Station information settings	13) All connect count	2 Modules

∗1: To set the CC-Link system to the remote net Additional mode, select "Remote net Additional mode."

Table 13.4 Station Information Setting Check List

Sta. No.	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/invalid station select	Intelligent buffer select (word)		
						Send	Receive	Automatic
14) 1	Ver.1 Remote device station	single	Occupies 3 stations	96 points	No setting			
15) 4	Ver.2 Remote device station	quadruple	Occupies 1 station	64 points	No setting			

13.2.3 Setting the remote device station

The following shows the remote device station switch settings.

AJ65VBTCU-68DAV
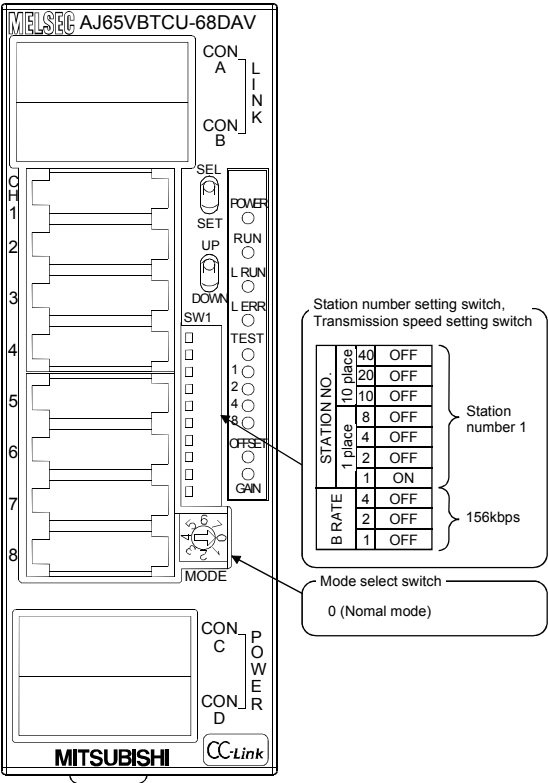
AJ65VBTCU-68DAVN
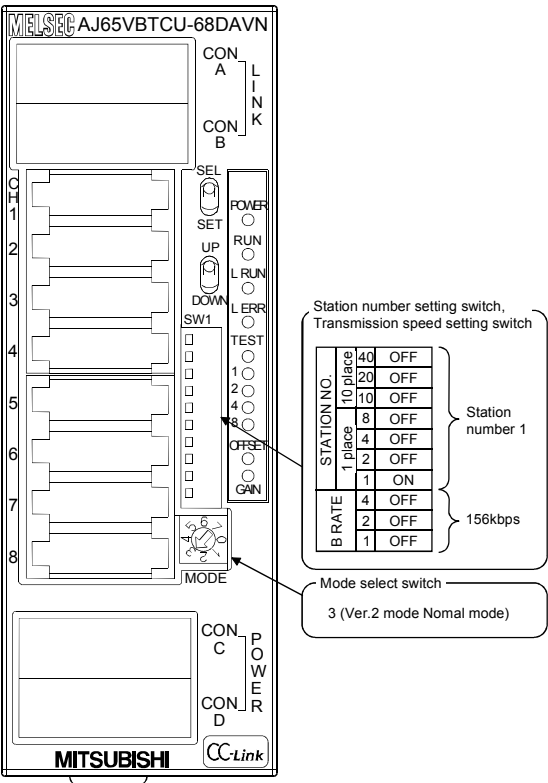
13.2.4 Creating a program

Create the digital value setting program for performing the initial setting and outputting analog values for remote device stations of station No.4[1].
The programming procedure for station No.4[1] is the same as the one used in the remote net Ver.1 mode.
Refer to Section 13.1.4.

[1]: For the remote device station of station No.4, device Nos. of the remote input (RX) and remote output (RY) and addresses of the remote register (RWr, RWw) are changed.

Master station (station No. 0)
IBM PC/AT compatible PC

Remote device station (station No. 1)

Remote device station (station No. 4)

User program	CC-Link Ver.2 board		

Remote inputs[1] (RX)

	RX18
	RX19
	:
	RX1B
	:
2) 8)	RX78
14) 18)	RX79
18)	RX7B
	:

mdReceive

1) 7) X18 (initial data processing request flag)
13) 17) X19 (initial data setting completion flag)
17) X1B (remote station ready)

Remote outputs[1] (RY)

	RY00
	:
	RY18
	RY19
	:
19)	RY60
5) 9)	RY78
11) 15)	RY79
	:

mdSend

12) Y00 (CH. analog output enable signal flag)
6) 10) Y18 (initial data processing completion flag)
12) 16) Y19 (initial data setting request flag)

Remote resisters[1] (RWw)

	RWw0
	:
	RWw8
	:
19)	RWwC
3)	RWw14
	:

mdSend

20) RWw0 (CH.1 digital value setting area)
4) RWw8 (analog output enable/disable setting area)

13.2.5 Executing the data link

Turn ON the remote device stations and the master station in this order, and then start
the data link.

(1) Checking the data link status
    The following describes how to check the operation status of the master station
    and remote device stations under normal data link condition.

    (a) Checking the master station
        How to check the master station is the same as in the remote net Ver.1
        mode.
        Refer to Section 13.1.5 (1) (a).

    (b) Checking remote device stations
        How to check the remote device stations is the same as in the remote net
        Ver.1 mode.
        Refer to Section 13.1.5 (1) (b).
        For the AJ65VBTCU-68DAVN, check the identical location as the LEDs on
        the AJ65VBTCU-68DAV.

(2) Confirming the operation with a user program

With the user program, check whether digital values are being output to remote device stations through normal data link.

Use of the sample program allows the operation check in the following system configuration. (For the sample program, refer to Section 11.9.)

On the sample program, setting a digital value of "300" enables analog voltages to be output from remote device stations.
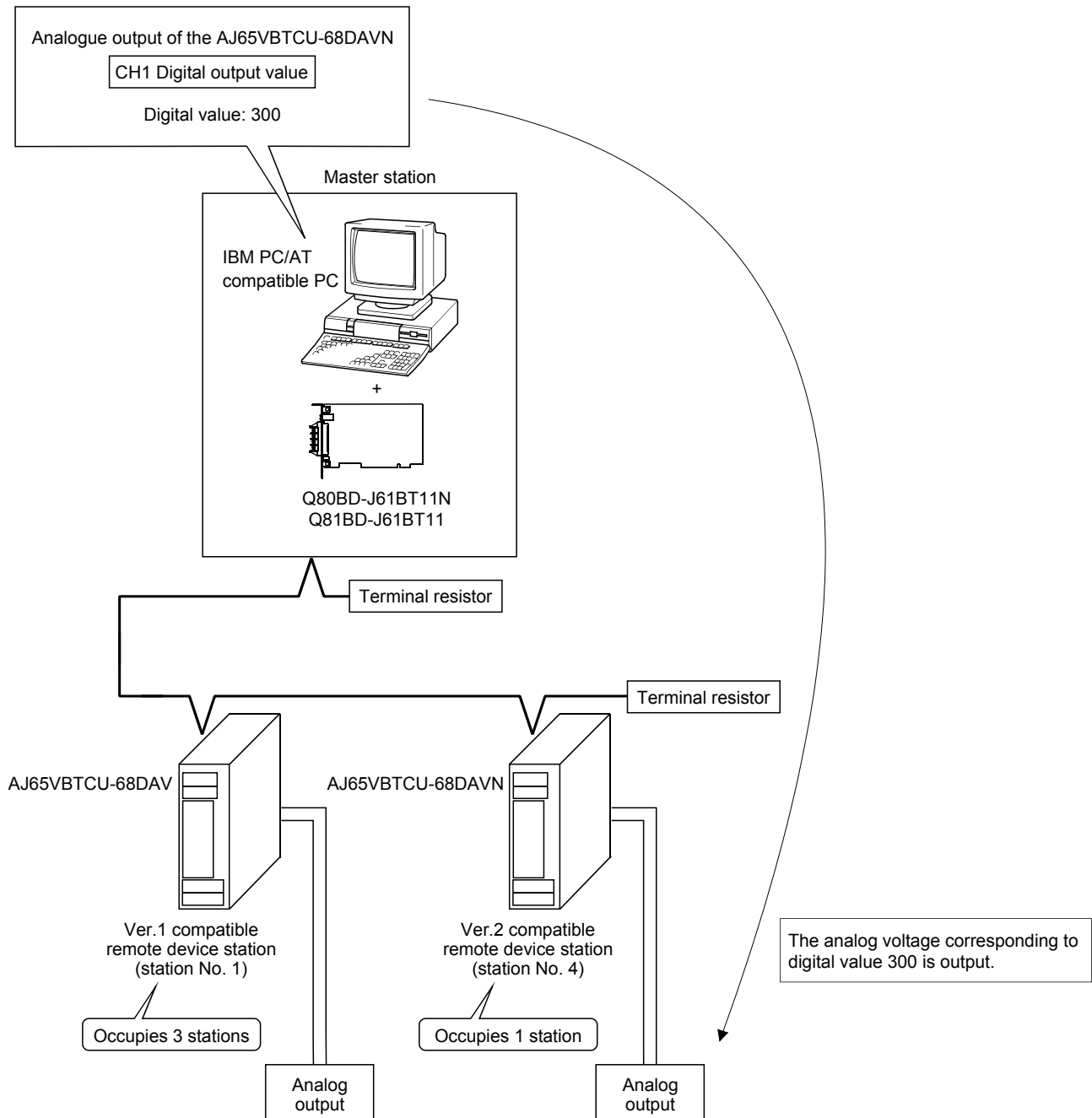
14 COMMUNICATION BETWEEN THE MASTER STATION AND LOCAL STATIONS

This section gives a system configuration example to explain the CC-Link Ver.2 board and local station setting, parameter setting, programming and operation check.

14.1 When Using the Remote Net Ver.1 Mode

The following describes communications in the remote net Ver.1 mode.

14.1.1 Configuring the system

In this system, one local station shall be connected.
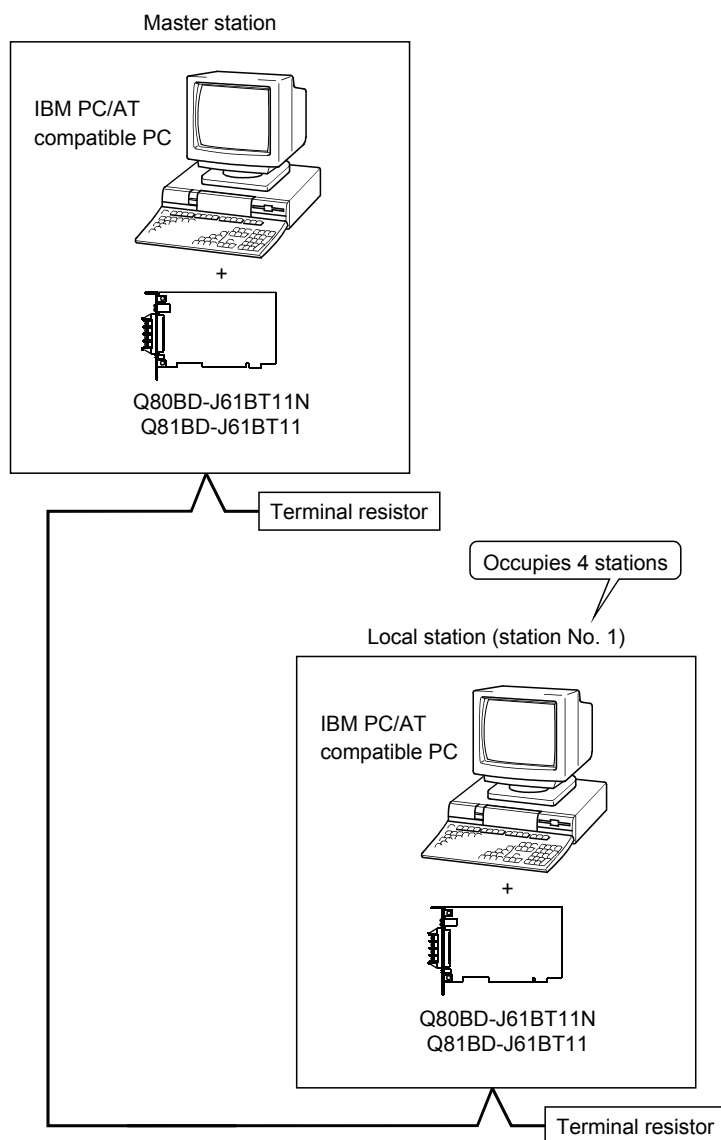
Master station

IBM PC/AT compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Occupies 4 stations

Local station (station No. 1)

IBM PC/AT compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

14

14

14.1.2 Setting the master station

The following shows the master station setting.

(1)   Switch setting (channel No. setting)
The channel No. for the CC-Link Ver.2 board is set to 81 as an example in this
section.

Channel No. setting switch

Switch No.	Setting
1	OFF
2	OFF

(2) Parameter settings
The following shows the master station's parameter settings by the CC-Link
Ver.2 Utility.

<Parameter settings screen>   <Other settings screen>
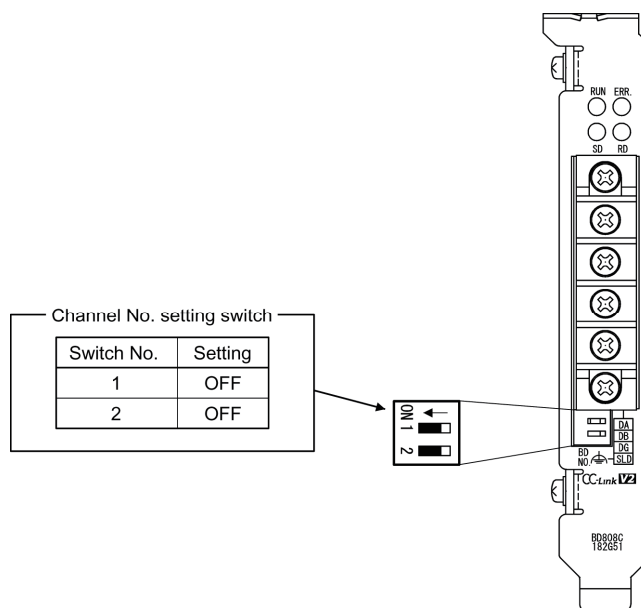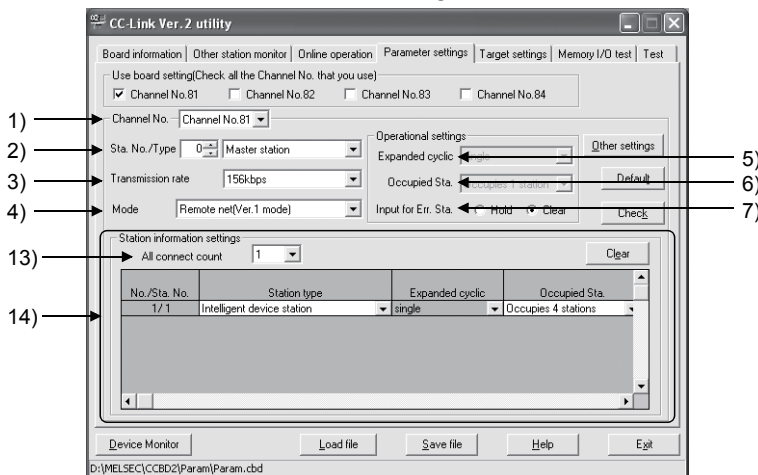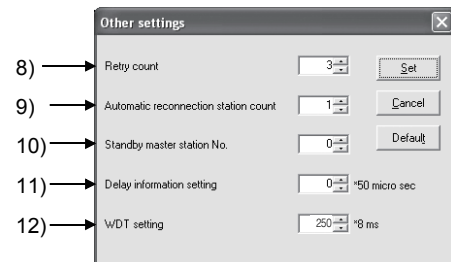
(a) Parameter settings
The following shows the parameter setting values. The parameter setting
check list and the station information setting check list in Appendix can be
used for the setting.

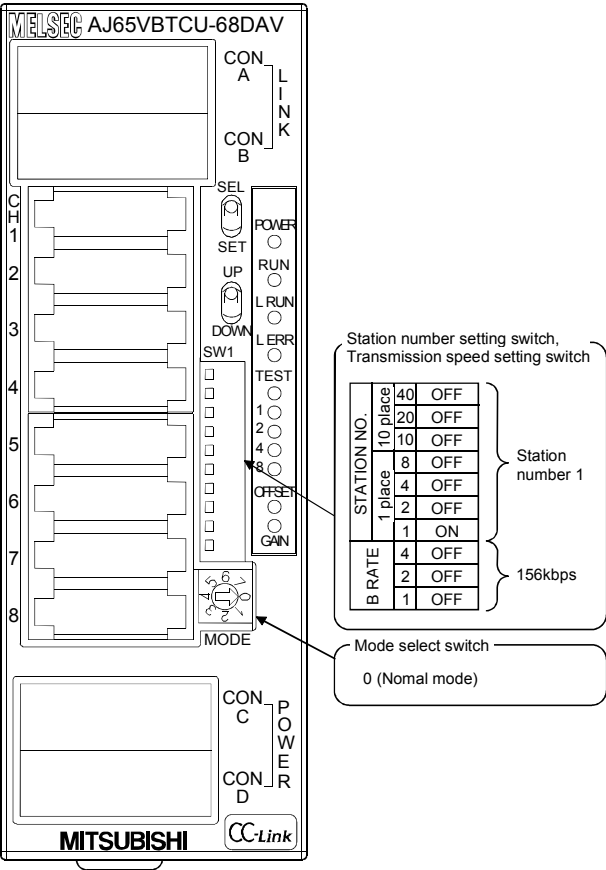### Table 14.1 Parameter Setting Check List

Setting item		Setting range/Item
1) Channel No.		Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84
2) Sta. No./Type	No.0	Master station / Local station / Standby master station
3) Transmission rate		156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps
4) Mode		Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line
Operational settings	5) Expanded cyclic	single / double / quadruple / octuple
	6) Occupied Sta.	Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations
	7) Input for Err. Sta.	Hold Clear
Other settings	8) Retry count	3 Times
	9) Automatic reconnection station count	1 Modules
	10) Standby master station No.	No.0
	11) Delay information setting	0 × 50 micro sec
	12) WDT setting	250 × 8 ms
Station information settings	13) All connect count	1 Modules

Table 14.2 Station Information Setting Check List

Sta. No.	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/invalid station select	Intelligent buffer select (word)		
						Send	Receive	Automatic
14) 1	Intelligent device station *[1]	single	Occupies 4 stations	128 points	No setting	64	64	128
2								
3								

*1: For the local station, select an intelligent device station.

14.1.3 Setting the local station

The following shows the local station setting.

(1) Switch setting (channel No. setting)
  The channel No. for the CC-Link Ver.2 board is set to 81 as an example in this section.
  For the setting, refer to Section 14.1.2 (1).

(2) Parameter settings
  The following shows the local station's parameter settings by the CC-Link Ver.2 Utility.

<Parameter settings screen>   <Other settings screen>

(a) Parameter settings
  The following shows the parameter setting values. The parameter setting check list and the station information setting check list in Appendix can be used for the setting.

Table 14.3 Parameter Setting Check List

Setting item		Setting range/Item	
1) Channel No.		Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84	
2) Sta. No./Type		No.1	Master station / Local station / Standby master station
3) Transmission rate		156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps	
4) Mode		Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line	
Operational settings	5) Expanded cyclic	single / double / quadruple / octuple	
	6) Occupied Sta.	Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations	
	7) Input for Err. Sta.	Hold / Clear	
Other settings	Retry count	Times	
	Automatic reconnection station count	Modules	
	Standby master station No.	No.	
	Delay information setting	× 50 micro sec	
	8) WDT setting	250 × 8 ms	
Station information settings	All connect count	Modules	

14.1.4 Creating a program

Create the program for reading the remote input (RX), writing the remote output (RY), reading the remote registers (RWr) and writing remote registers (RWw) from/to the local station.

The following illustrates the relation between the I/O operations and the user program when sending/receiving data between the master station and local station.

(The shaded areas indicate the devices that are actually used.)

(Master station)			(Local station)
User Program	CC-Link Ver.2 Board	CC-Link Ver.2 Board	User Program

2) Reads out the remote input (RX0) of the CC-Link Ver.2 board on the master station.
Arguments to be set:
    Station No.=0xFF (own station)
    Device type=0x1 (own station RX)
    Device No.=0x0
	←	←	← 1) Turn ON the remote output (RY0) of the CC-Link Ver.2 board on the local station.
			Arguments to be set:
			    Station No.=0xFF (own station)
			    Device type=0x2 (own station RY)
			    Device No.=0x0

3) Turnr ON the remote output (RY0) of the CC-Link Ver.2 board on the master station with the read out remote input (RX0) ON.
Arguments to be set:
    Station No.=0xFF (own station)
    Device type=0x2 (own station RY)
    Device No.=0x0
	→	→	→ 4) Reads out the remote input (RX0) of the CC-Link Ver.2 board on the local station.
			Arguments to be set:
			    Station No.=0xFF (own station)
			    Device type=0x1 (own station RX)
			    Device No.=0x0

6) Reads out the remote register (RWr0) of the CC-Link Ver.2 board on the master station.
Arguments to be set:
    Station No.=0xFF (own station)
    Device type=0x25 (own station RWr)
    Device No.=0x0
	←	←	← 5) Writes 0x5555 to the remote register (RWw0) of the CC-Link Ver.2 board on the local station with the read out remote input register (RX0)ON.
			Arguments to be set:
			    Station No.=0xFF (own station)
			    Device type=0x24 (own station RWw)
			    Device No.=0x0

7) Writes 0xAAAA to the remote register (RWw0) of the CC-Link Ver.2 board on the master station if the read out remote register (RWr0) is 0x5555.
Arguments to be set:
    Station No.=0xFF (own station)
    Device type=0x24 (own station RWw)
    Device No.=0x0
	→	→	→ 8) Reads out the remote register (RWr0) of the CC-Link Ver.2 board on the local station.
			Arguments to be set:
			    Station No.=0xFF (own station)
			    Device type=0x25 (own station RWr)
			    Device No.=0x0

14.1.5 Executing the data link

Turn ON the local stations and the master station in this order, and then start the data link.

(1) Checking the data link status

The following describes how to check the operation status of the master station and local stations under normal data link condition.

(a) Checking the master station and local stations

Check the status of the master station and local stations.

1) Checking by the LED indication on the CC-Link Ver.2 board

Make sure that the LED status is as follows:

●:ON   ○:OFF

The CC-Link Ver.2 board is operating normally.

Data are being transmitted.

No error has occurred.

Data are being received.

2) Checking by the CC-Link Ver.2 Utility

Check that the Board detail information of the CC-Link Ver.2 Utility is displayed as shown below.

In data link: Normal data link is being performed.

Normal: The CC-Link Ver.2 board is operating normally.

ON (green): The CC-Link Ver.2 board is operating normally.

OFF: No error has occurred.

(2) Confirming the operation with a user program

With the user program, check whether the data link is being performed normally or not by transferring data between the master station and local stations.
Use of the sample program allows the operation check in the following system configuration.
(Execute user program of the local station within 10 minutes after an user program of the master station has been loaded.)

When the remote output (RY0) 2) turns ON, the remote input (RX0) 1) turns ON.
When the remote output (RY0) 3) turns ON, the remote input (RX0) 4) turns ON.
When data are set to the remote register (RWw0) 6), values are written to the remote register (RWr0) 5).
When data are set to the remote register (RWw0) 7), values are written to the remote register (RWr0) 8).

Master station

IBM PC/AT
compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Occupies 4 stations

Local station (station No. 1)

IBM PC/AT
compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Receive (RX)
1) Master station RX0
2) Local station RY0

Send (RY)
3) Master station RY0
4) Local station RX0

Receive (RWr)
5) Master station RWr0 — n2 — 5555H
6) Local station RWw0 — n1 — 5555H

Send (RWw)
7) Master station RWw0 — m2 — 5555H
8) Local station RWr0 — m1 — 5555H

14.2 When Using the Remote Net Ver.2 Mode or Remote Net Additional Mode

The following describes communications in the remote net Ver.2 mode or the remote net additional mode.

14.2.1 Configuring the system

In this system, 2 local stations shall be connected.
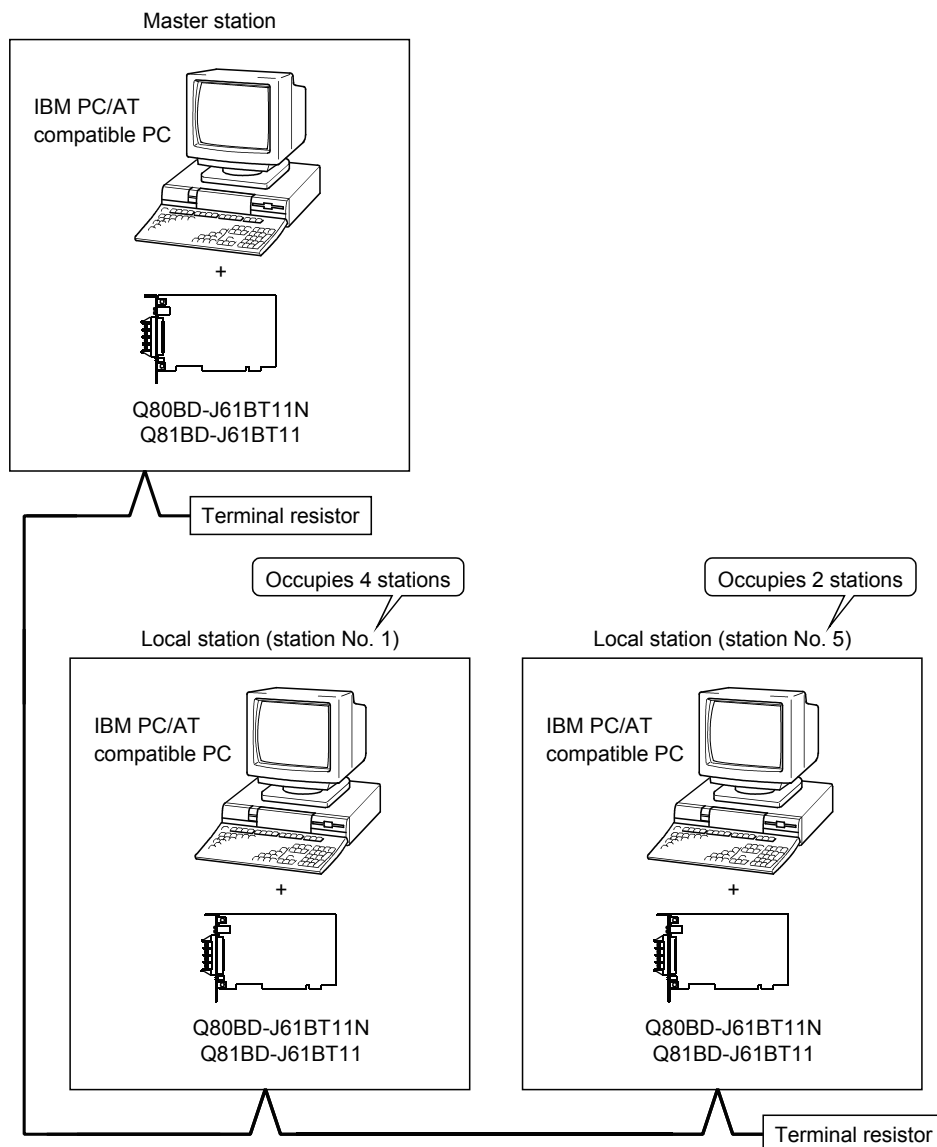
14.2.2 Setting the master station

The following shows the master station setting.

(1) Switch setting (channel No. setting)
    The channel No. for the CC-Link Ver.2 board is set to 81 as an example in this
    section.

Channel No. setting switch

Switch No.	Setting
1	OFF
2	OFF

(2) Parameter settings

The following shows the master station's parameter settings by the CC-Link Ver.2 Utility.

<Parameter settings screen>   <Other settings screen>
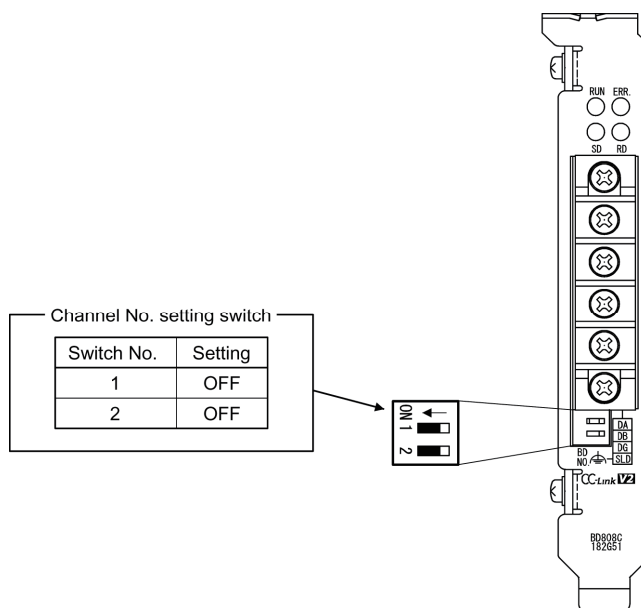
(a) Parameter settings

The following shows the parameter setting values. The parameter setting check list and the station information setting check list in Appendix can be used for the setting.

Table 14.4 Parameter Setting Check List

| Setting item		Setting range/Item
1) Channel No.		Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84
2) Sta. No./Type		No.0 Master station / Local station / Standby master station
3) Transmission rate		156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps
4) Mode [1]		Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line
Operational settings	5) Expanded cyclic	single / double / quadruple / octuple
	6) Occupied Sta.	Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations
	7) Input for Err. Sta.	Hold Clear
Other settings	8) Retry count	3 Times
	9) Automatic reconnection station count	1 Modules
	10) Standby master station No.	No.0
	11) Delay information setting	0 × 50 micro sec
	12) WDT setting	250 × 8 ms
Station information settings	13) All connect count	2 Modules

∗1: To set the CC-Link system to the remote net Additional mode, select "Remote net Additional mode."

Table 14.5 Station Information Setting Check List

Sta. No.	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/invalid station select	Intelligent buffer select (word)		
						Send	Receive	Automatic
14) 1	Ver.1 Intelligent device station ∗2	single	Occupies 4 stations	128 points	No setting	64	64	128
15) 4	Ver.2 Intelligent device station ∗2	double	Occupies 2 stations	96 points	No setting	64	64	128

∗2: For the local station, select an intelligent device station.

14.2.3 Setting the local station

The following shows the local station setting.

(1) Switch setting (channel No. setting)

The channel No. for the CC-Link Ver.2 board is set to 81 as an example in this section.

For the setting, refer to Section 14.2.2 (1).

(2) Parameter settings

The following shows the local station's parameter settings by the CC-Link Ver.2 Utility.

<Parameter settings screen>   <Other settings screen>

(a) Parameter settings

The following shows the parameter setting values. The parameter setting check list and the station information setting check list in Appendix can be used for the setting.

Table 14.3 Parameter Setting Check List

Setting item			Setting range/Item	
1) Channel No.			Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84	
2) Sta. No./Type *1		No.1	Master station / Local station / Standby master station	
3) Transmission rate			156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps	
4) Mode *2			Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line	
Operational *3 settings	5) Expanded cyclic		single / double / quadruple / octuple	
	6) Occupied Sta.		Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations	
	7) Input for Err. Sta.		Hold / Clear	
Other settings	Retry count		Times	
	Automatic reconnection station count		Modules	
	Standby master station No.		No.	
	Delay information setting		× 50 micro sec	
	8) WDT setting		250 × 8 ms	
Station information settings	All connect count		Modules	

∗1: Set station No.5 to the Ver.2 Intelligent device station.
∗2: Set Remote net [Ver.2 mode] to the Ver.2 intelligent device stations.
∗3: Set "double" and "occupied 2 stations" to the Ver.2 intelligent device station.

14.2.4 Creating a program

Create a program for reading the remote input (RX), writing the remote output (RY), reading the remote registers (RWr), and writing the remote registers (RWw) for local stations of station No.5[1].

The programming procedure for station No.5 is the same as in the remote net Ver.1 mode.

Refer to Section 14.1.4.

[1]: For the local station of station No.5, device Nos. of the remote input (RX) and remote output (RY) and addresses of the remote registers (RWr, RWw) are changed.
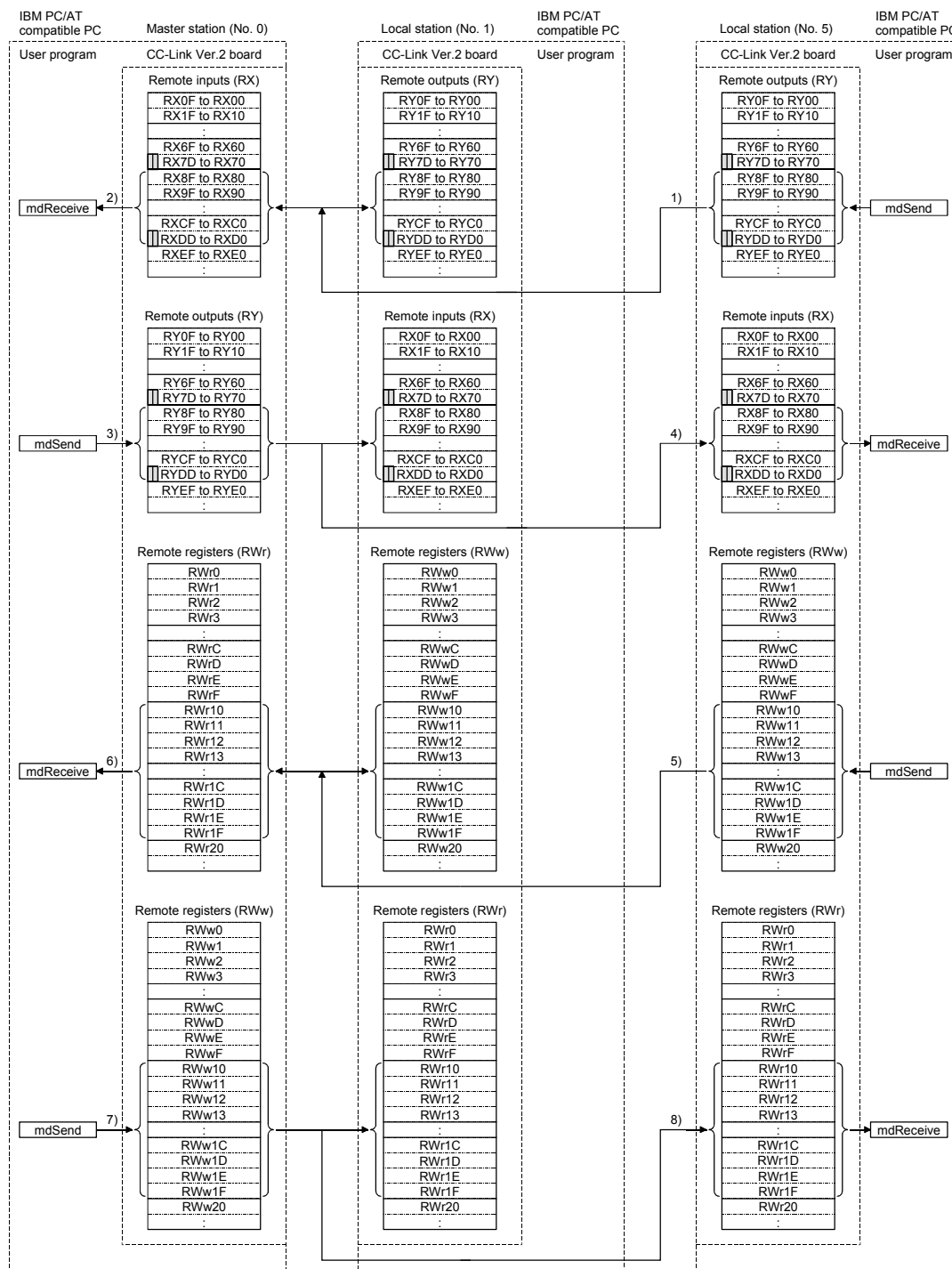
14.2.5 Executing the data link

Turn ON the local stations and the master station in this order, and then start the data link.

(1) Checking the data link status
      Refer to Section 14.1.5 (1) (a) "Checking the master station and local stations" for how to check the operation status of the master station and local stations (Ver.1 intelligent device stations, Ver.2 intelligent device stations) under normal data link condition.

(2) Confirming the operation with a user program
      With a user program, check whether the data link is performed correctly or not by transferring data between the master station and the local stations.
      Use of the sample program allows the operation check in the system configuration shown on the next page.
      (Execute user program of the local station (Sta. No. 1 and 5) within 10 minutes after an user program of the master station has been loaded.)

      When the remote output (RY80) 3) is turned ON, the remote input (RX80) 1) and the remote output (RY80) 2) turns ON.
      When the remote output (RY0) 4) is turned ON, the remote input (RX0) 5) and 6) turn ON.
      When a value is set to the remote register (RWw10) 9), the value is written to the remote register (RWr10) 7) and the remote register (RWw10) 8).
      When a value is set to the remote register (RWw0) 10), the value is written to the remote registers (RWr0) 11) and 12).

Master station

IBM PC/AT
compatible PC

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Occupies 4 stations

Local station (station No. 1)

IBM PC/AT
compatible PC

Q80BD-J61BT11N
Q81BD-J61BT11

Occupies 2 stations

Local station (station No. 5)

IBM PC/AT
compatible PC

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Receive
(RX)

1) Master station
RX80

2) Local station (No. 1)
RY80

3) Local station (No. 5)
RY80

Send
(RY)

4) Master station
RY0

5) Local station (No. 1)
RX0

6) Local station (No. 5)
RX0

Receive

7) Master station
RWr0 — $n3$ — 5555_H

8) Local station (No. 1)
RWw10 — $n2$ — 5555_H

9) Local station (No. 5)
RWw10 — $n1$ — 5555_H

Send
(RWw)

10) Master station
RWw0 — $m1$ — $AAAA_H$

11) Local station (No. 1)
RWr0 — $m2$ — $AAAA_H$

12) Local station (No. 5)
RWr0 — $m3$ — $AAAA_H$

MEMO

15 COMMUNICATION BETWEEN THE MASTER STATION AND INTELLIGENT DEVICE STATION (AJ65BT-R2)

This section gives f a system configuration example to explain the CC-Link Ver.2 board and intelligent device station setting, parameter setting, programming and operation check.

For details on the intelligent device stations, refer to the RS-232C Interface Module type AJ65BT-R2 User's Manual.

15.1 Configuring a System

In this example, a system consisting of a master station and one intelligent device station (AJ65BT-R2) as shown below is used.
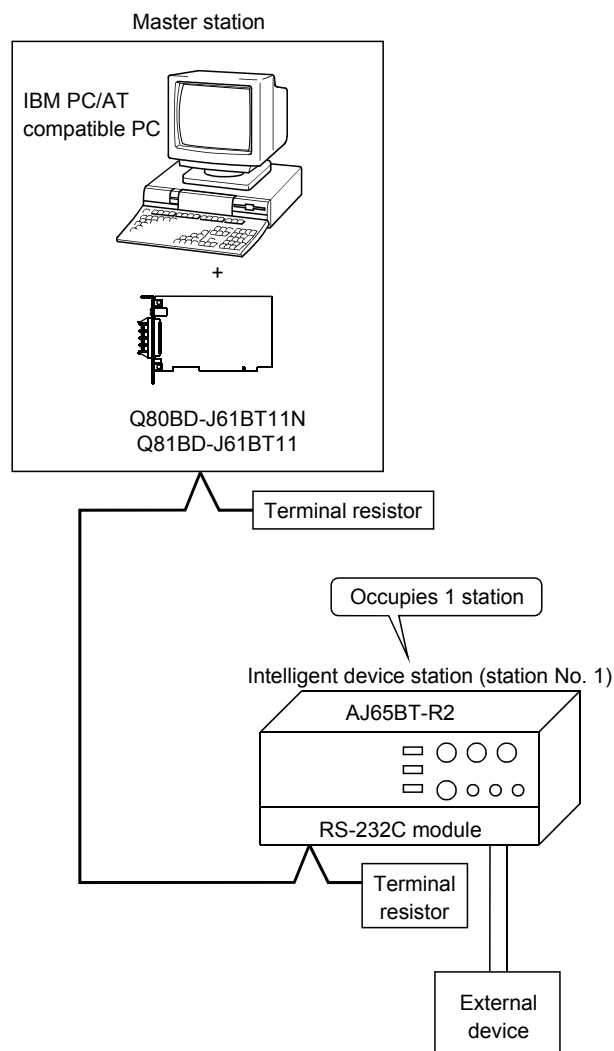
15.2 Setting the Master Station

The following shows the master station setting.

15.2.1 Switch setting (channel No. setting)

The channel No. for the CC-Link Ver.2 board is set to 81 as an example in this section.

Channel No. setting switch

Switch No.	Setting
1	OFF
2	OFF
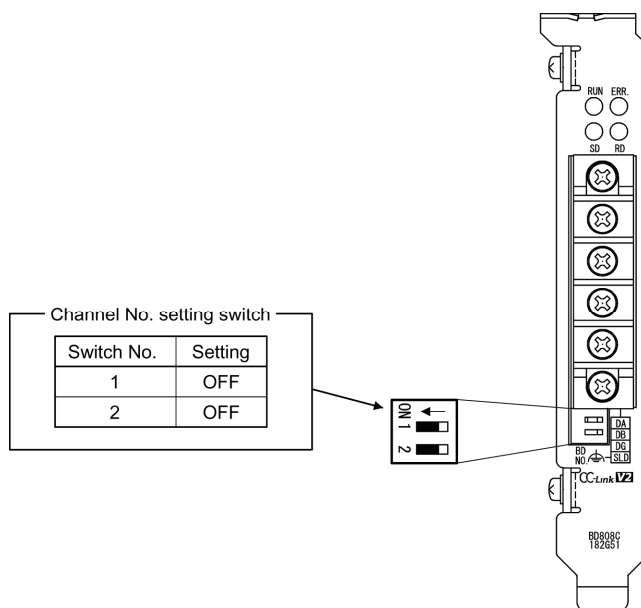
15.2.2 Parameter settings

The following shows the master station's parameter settings by the CC-Link Ver.2 Utility.

<Parameter settings screen>   <Other settings screen>
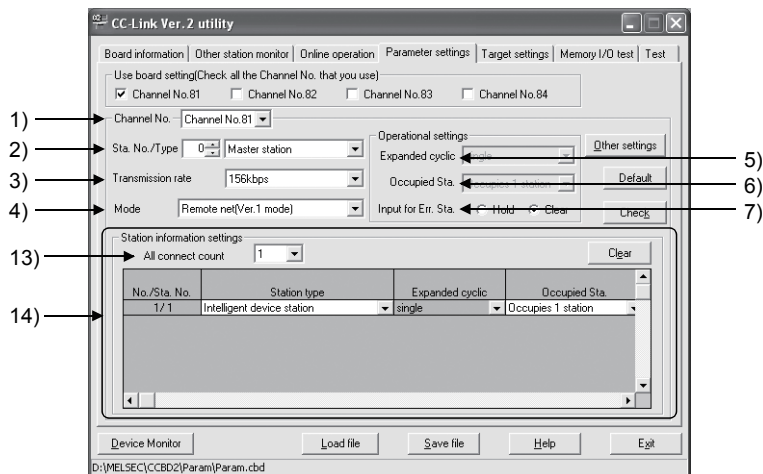
(1) Parameter settings

The following shows the parameter setting values. The parameter setting check list and the station information setting check list in Appendix can be used for the setting.

Table 15.1 Parameter Setting Check List

Setting item		Setting range/Item
1) Channel No.		Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84
2) Sta. No./Type		No.0 Master station / Local station / Standby master station
3) Transmission rate		156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps
4) Mode		Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line
Operational settings	5) Expanded cyclic	single / double / quadruple / octuple
	6) Occupied Sta.	Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations
	7) Input for Err. Sta.	Hold Clear
Other settings	8) Retry count	3 Times
	9) Automatic reconnection station count	1 Modules
	10) Standby master station No.	No.0
	11) Delay information setting	0 × 50 micro sec
	12) WDT setting	250 × 8 ms
Station information settings	13) All connect count	1 Modules

Table 15.2 Station Information Setting Check List

Sta. No.	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/invalid station select	Intelligent buffer select (word)		
						Send	Receive	Automatic
14) 1	Intelligent device station	single	Occupies 1 station	32 points	No setting	64	64	128
2								
3								

15.3 Setting up the intelligent device station

The settings of the intelligent device station switches are shown below:

Transmission rate setting switch

0 (156 kbps)

Station No. setting switch

Module	×10	×1
AJ65BT-R2	0	1

Mode setting switch

Set the operation mode of the module.

RS-232C transmission specification setting switches

Set according to the transmission specification of the external device.

15.4 Creating a Program

Create a program for making the following setting and data transfer to the AJ65BT-R2.

• Initialization of the AJ65BT-R2 .... Refer to Section 15.4.1.
• Data transmission .... Refer to Section 15.4.2.
• Data reception.................................... Refer to Section 15.4.3.

15.4.1 Initialization of the AJ65BT-R2

The following describes initialization of the AJ65BT-R2 [*1], and shows the relation between the user program on the PC and intelligent device station's I/O operations. (The shaded areas indicate the devices that are actually used.)

[*1]: In the AJ65BT-R2 initialization, default values are used for settings other than those indicated in the buffer memory section of the illustration below.

[*1]: When the remote net Ver.2 mode is selected, refer to the figure in Section 4.4.7 (1).
        When the remote net additional mode is selected, refer to the figure in Section 4.4.7 (2).

User Program	CC-Link Ver.2 Board
1) Writes the initial setting values for transmission/ reception to the buffer memory on the AJ65BT-R2. Arguments to be set: Word/byte unit designation=0 Transmission area head address designation=200H Transmission area size designation=200H Reception area head address designation=400H Reception area size designation=200H Transmission timeout time designation=0	
2) Turns ON the initialization request signal (RY4). →	3) Turns ON the initialization request signal (RY4) of the AJ65BT-R2.
5) Reads out the initialization normal complete signal (RX4). ←	4) If the initialization of the AJ65BT-R2 is normal, the initialization normal complete signal (RX4) turns ON. If not, the initialization error complete signal (RX5) turns ON.
6) With the initialization normal complete signal (RX4) ON, the initialization request signal (RY4) is turned OFF. →	7) Turns OFF the initialization request signal (RY4). 8) The AJ65BT-R2 turns OFF the initialization normal complete signal (RX4) and the initialization error complete signal (RX5).

15.4.2 Data transmission

The following illustrates the relation between the intelligent device station's I/O
operations and the user program on the PC and their data transmission. (The shaded
areas indicate the devices that are actually used.)

∗1: When the remote net Ver.2 mode is selected, refer to the figure in Section 4.4.7(1).
When the remote net additional mode is selected, refer to the figure in Section 4.4.7(2).

User Program	CC-Link Ver.2 Board
1) Writes the send data to the transmission area of the AJ65BT-R2 buffer memory.	
2) Turn ON the transmission request signal (RY0).	3) Turn ON the transmission request signal (RY0) of the AJ65BT-R2.
	4) The AJ65BT-R2 sends data to external equipment, and if the transmission is normal, it turns ON the transmission normal complete signal (RX0). If an error is identified in the transmission, the AJ65BT-R2 turns ON the transmission error complete signal (RX1).
5) Reads out the transmission normal complete signal (RX0) and the transmission error complete signal (RX1).	
6) Turns OFF the transmission request signal (RY0).	7) Turns OFF the transmission request signal (RY0) of the AJ65BT-R2.
	8) The AJ65BT-R2 turns OFF the transmission normal complete signal (RX0) or transmission error complete signal (RX1).

15.4.3 Data reception

The following illustrates the relation between the intelligent device station's I/O operations and the user program on the PC in data reception.
(The shaded areas indicate the devices that are actually used.)

∗1: When the remote net Ver.2 mode is selected, refer to the figure in Section 4.4.7(1).
When the remote net additional mode is selected, refer to the figure in Section 4.4.7(2).

User Program	CC-Link Ver.2 Board
2) Reads out the reception normal read request signal (RX2) and the reception error read request signal (RX3).	1) When the AJ65BT-R2 receives data from external equipment, the reception normal read request signal (RX2) or reception error read request signal (RX3) is turned ON.
3) With the reception normal read request signal (RX2) ON, reads out the received data.	
4) Turns ON the reception read complete signal (RY2).	5) Turns ON the reception read complete signal (RY2) of the AJ65BT-R2.
	6) The AJ65BT-R2 turns OFF the reception normal read complete signal (RX2) or reception error read complete signal (RX3).
7) Reads out the reception normal read request signal (RX2).	
8) Turns OFF the reception read complete signal (RY2).	

15.5 Executing the Data Link

To start the data link , first power on the intelligent device station, and then the master station.

15.5.1 Checking the data link status

The following describes how to check the operation status of the master station and intelligent device stations under normal data link condition.

(1) Checking the master station
Check the operating status of the master station.

(a) Checking by the LED indication on the CC-Link Ver.2 board
Make sure that the LED status is as follows.

●:ON   ○:OFF

The CC-Link Ver.2 board is operating normally.

Data are being transmitted.

No error has occurred.

Data are being received.

(b) Checking by the CC-Link Ver.2 Utility
Check that the Board detail information on the CC-Link Ver.2 Utility is displayed as shown below.

In data link: Normal data link is being performed.

Normal: The CC-Link Ver.2 board is operating normally.

ON (green): The CC-Link Ver.2 board is operating normally.

OFF: No error has occurred.

(2) LED displays of the intelligent device station
Be sure that the LED displays show the following status:

AJ65BT-R2 PW ✖	24 V DC is being supplied.
RUN ✖	The module is normally.
L RUN ●	The data link is being executed normally.
SD ✖	
RD ✖	Sending data.
L ERR. ○	Receiving data.
	No error has occurred.

✖ : On   ○ : Off

15.5.2 Confirming the operation with a user program

Using a user program, confirm that the data link is being executed normally.
Use of the sample program allows the operation check in the following system
configuration. (For details on the location where the sample program is stored, refer to
Section 11.9.)
With the sample program, initialization, transmission and reception are available.

MEMO
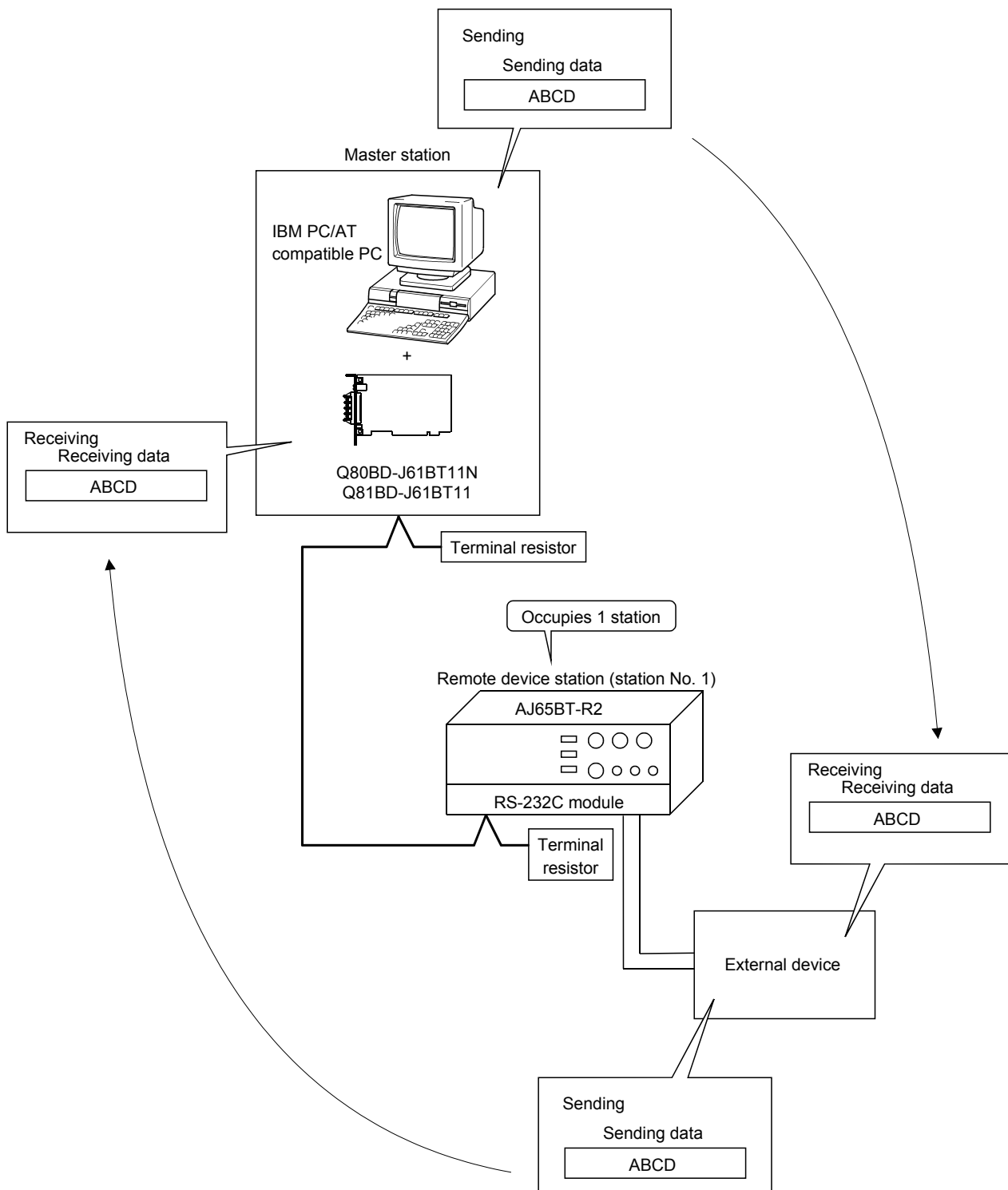
16 COMMUNICATION BETWEEN THE MASTER STATION AND INTELLIGENT DEVICE STATION (AJ65BT-D75P2-S3)

This section gives a system configuration example to explain the CC-Link Ver.2 board and intelligent device station setting, parameter setting, programming and operation check.

For details on intelligent device stations, refer to the AJ65BT-D75P2-S3 Positioning Module User's Manual.

16.1 Configuring a System

In this example, a system consisting of a master station and one intelligent device station (AJ65BT-D75P2-S3) as shown below is used.

Master station

IBM PC/AT compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Occupies 4 station

Intelligent device station (station No. 1)

AJ65BT-D75P2-S3

Positioning module

Terminal resistor

Servo amplifier

Motor

Servo amplifier

Motor

16
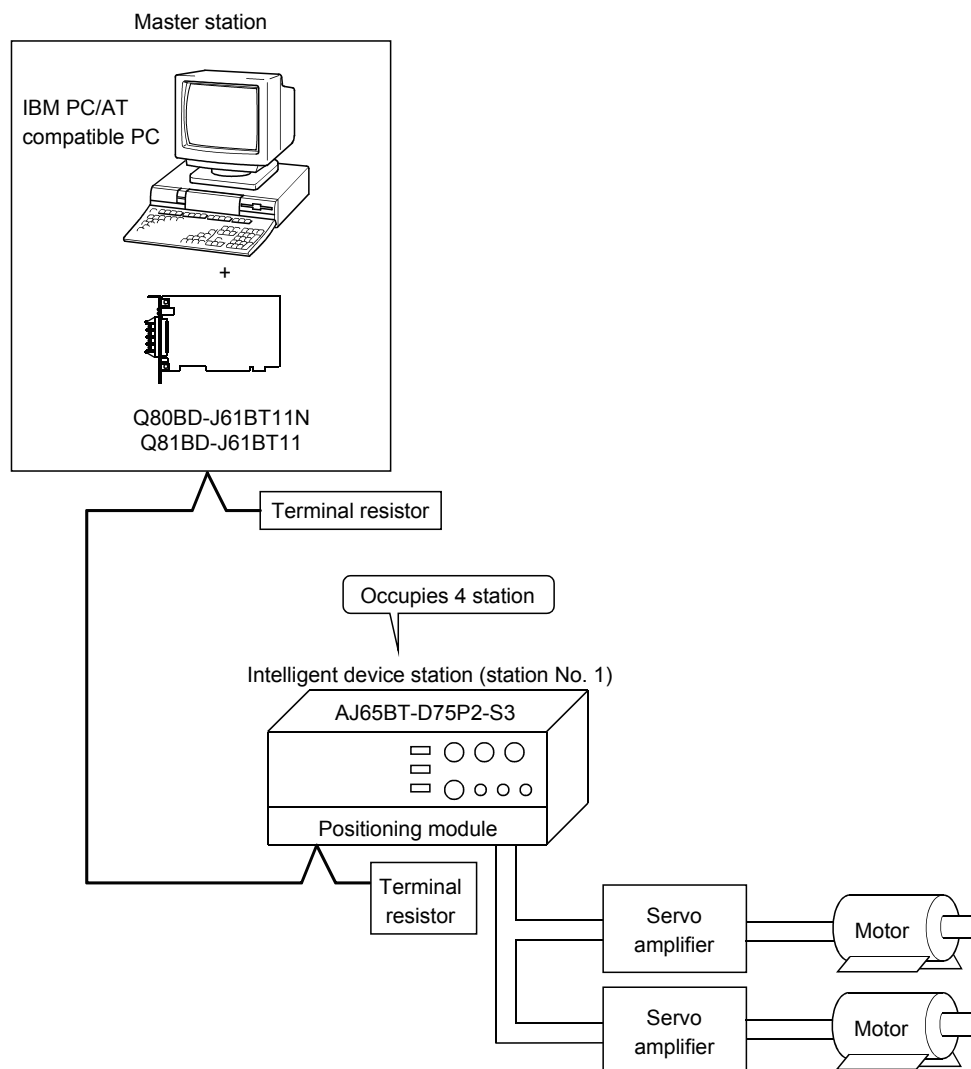
16.2 Setting the Master Station

The following shows the master station setting.

16.2.1 Switch setting (channel No. setting)

The channel No. for the CC-Link Ver.2 board is set to 81 as an example in this section.

Channel No. setting switch

Switch No.	Setting
1	OFF
2	OFF
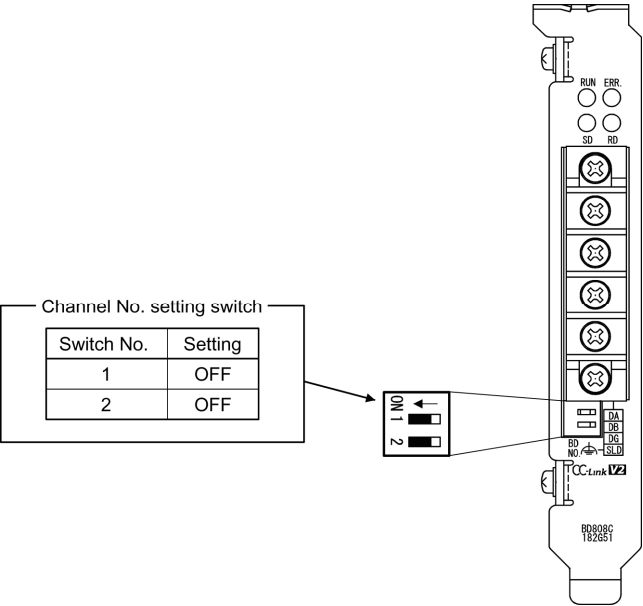
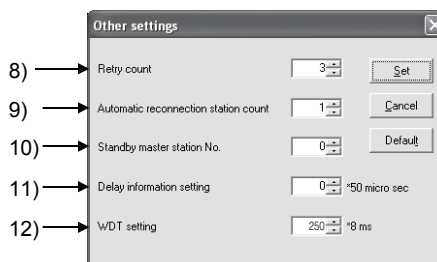## 16.2.2 Parameter settings

The following shows the master station's parameter settings by the CC-Link Ver.2 Utility.

<Parameter settings screen>   <Other settings screen>
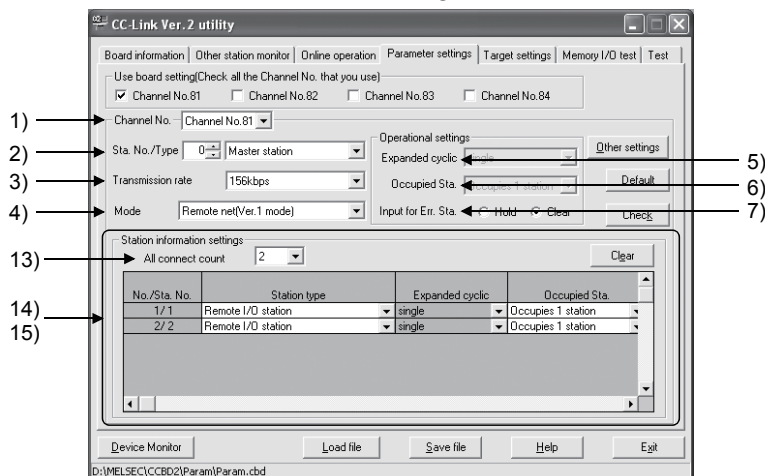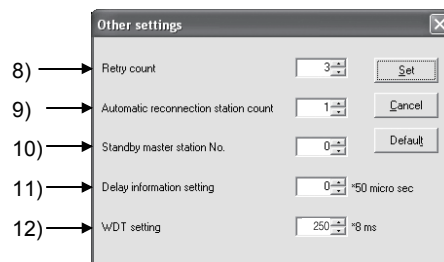
(1)   Parameter settings
The following shows the parameter setting values. The parameter setting check list and the station information setting check list in Appendix can be used for the setting.
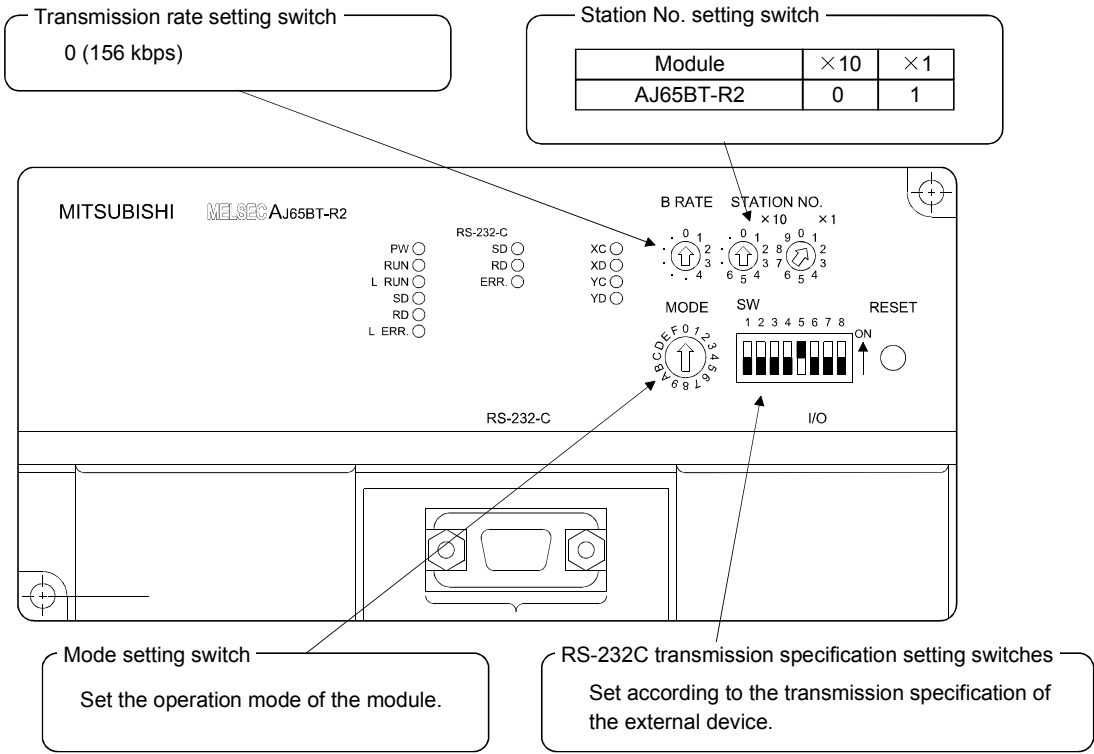
Table 16.1 Parameter Setting Check List

Setting item		Setting range/Item	
1) Channel No.			Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84
2) Sta. No./Type		No.0	Master station / Local station / Standby master station
3) Transmission rate			156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps
4) Mode			Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line
Operational settings	5) Expanded cyclic		single / double / quadruple / octuple
	6) Occupied Sta.		Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations
	7) Input for Err. Sta.		Hold / Clear
Other settings	8) Retry count		3 Times
	9) Automatic reconnection station count		1 Modules
	10) Standby master station No.		No.0
	11) Delay information setting		0 × 50 micro sec
	12) WDT setting		250 × 8 ms
Station information settings	13) All connect count		1 Modules

Table 16.2 Station Information Setting Check List

Sta. No.	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/invalid station select	Intelligent buffer select (word)		
						Send	Receive	Automatic
14) 1	Intelligent device station	single	Occupies 4 stations	128 points	No setting	64	64	128
2								
3								

16.3 Setting up the intelligent device station (AJ65BT-D75P2-S3)

The settings of the intelligent device station (AJ65BT-D75P2-S3) switches are shown below:

Transmission speed setting switch

0 (156 kbps)

Station No. setting switch

Module	×10	×1
AJ65BT-D75P2-S3	0	1
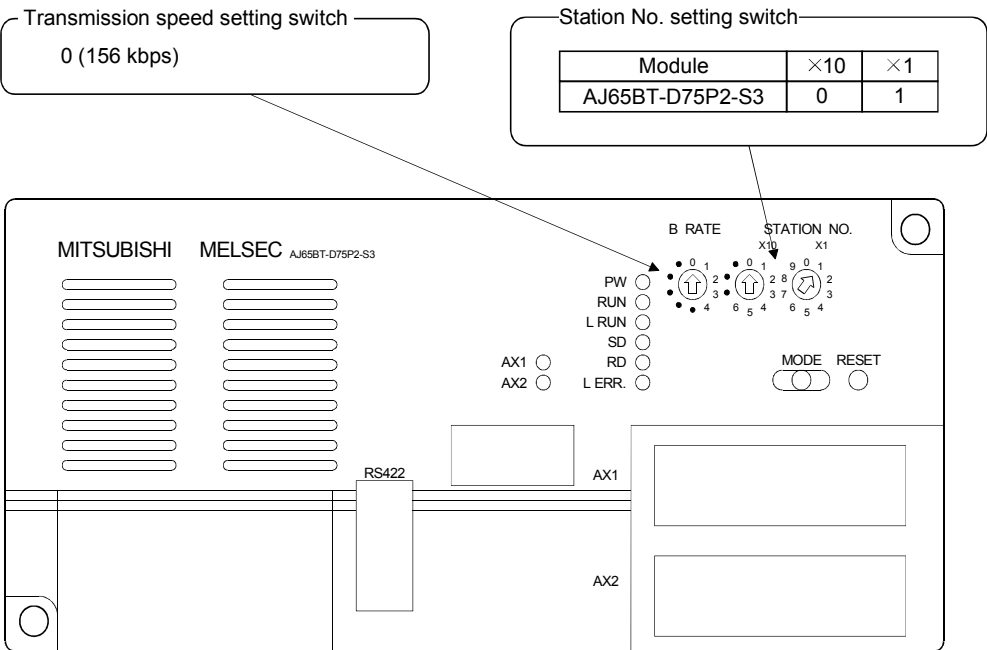
16.4 Creating a Program

Create the program for the following setting and controls of the AJ65BT-D75P2-S3.

- Initial setting .... Refer to Section 16.4.1.
- Zero point return control .... Refer to Section 16.4.2.
- Positioning control................. Refer to Section 16.4.3.
- JOG operation control........... Refer to Section 16.4.4.

> **POINT**
>
> Set parameters and perform positioning settings in advance with the AD75 software package. If a user program is used to perform reading and writing from/to the buffer memory, the communication time delay may occur and the user program becomes complicated.

16.4.1 Initial setting

The following shows the relation between the user program on the PC and intelligent device station's I/O operations, and initial setting of the AJ65BT-D75P2-S3.
(The shaded areas indicate the devices that are actually used.)

Master station (station No. 0)
IBM PC/AT compatible PC   Intelligent device station (station No. 1)

User program	CC-Link Ver.2 board			Intelligent device station

Remote inputs (RX) *1

	2) 6)	RX78	1) 5)	RX78 (initial data processing request flag)
mdReceive	12) 16)	RX79	11) 15)	RX79 (initial data setting complete flag)
		RX7A		:
	18)	RX7B	17)	RX7B (remote station ready)

Remote outputs (RY) *1

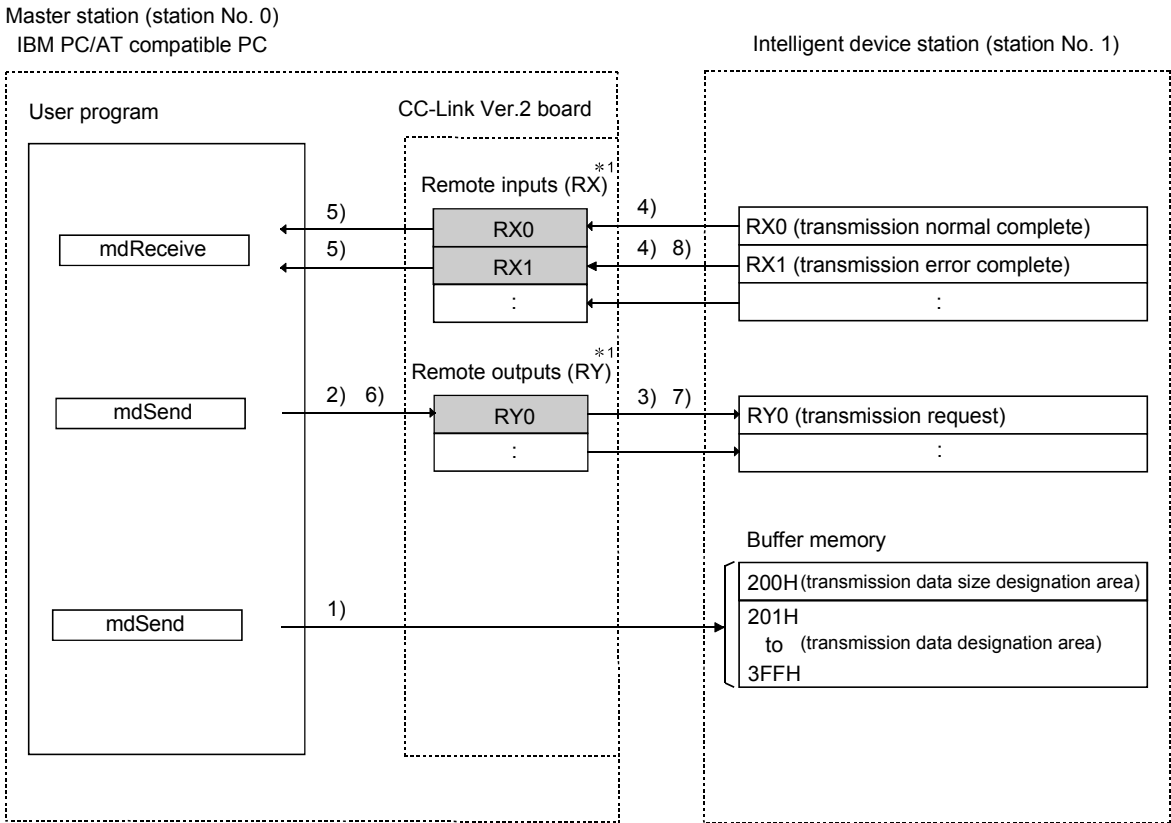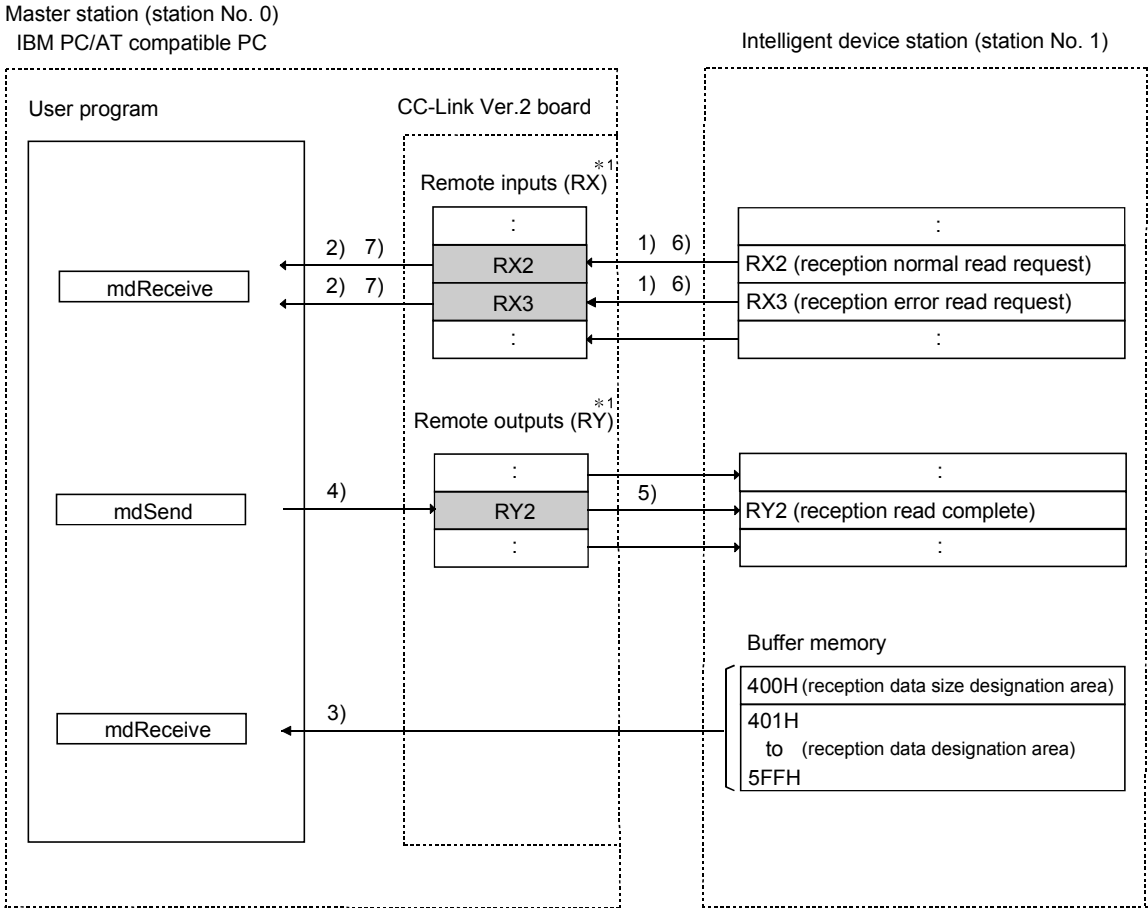| | 3) 7) | RY78 | 4) 8) | RY78 (initial data processing complete flag) |
| mdSend | 9) 13) | RY79 | 10) 14) | RY79 (initial data setting request flag) |

∗1: When the remote net Ver.2 mode is selected, refer to the figure in Section 4.4.7 (1).
     When the remote net additional mode is selected, refer to the figure in Section 4.4.7 (2).

User Program	CC-Link Ver.2 Board
2) Reads out the initial data processing request flag (RX78). ←	1) When the AJ65BT-D75P2-S3 is turned ON or reset by the reset switch, the initial data processing request flag (RX78) is turned ON.
3) With the initial data processing request flag (RX78) ON, turns ON the initial data processing complete flag (RY78). →	4) Turns ON the initial data processing complete flag (RY78) of the AJ65BT-D75P2-S3.
6) Reads out the initial data processing request flag (RX78). ←	5) The AJ65BT-D75P2-S3 turns OFF the initial data processing request flag (RX78).
7) With the initial data processing request flag (RX78) OFF, turns OFF the initial data processing complete flag (RY78). →	8) Turns OFF the initial data processing complete flag (RY78) of the AJ65BT-D75P2-S3.
9) Turn ON the initial data setting request flag (RY79). →	10) Turn ON the initial data setting request flag (RY79) of the AJ65BT-D75P2-S3.
12) Reads out the initial data setting complete flag (RX79). ←	11) The AJ65BT-D75P2-S3 turns ON the initial data setting complete flag (RX79).
13) With the initial data setting complete flag (RX79) ON, turns OFF the initial data setting request flag (RY79). →	14) Turns OFF the initial data setting request flag (RY79) of the AJ65BT-D75P2-S3.
16) Reads out the initial data setting complete flag (RX79). ←	15) The AJ65BT-D75P2-S3 turns OFF the initial data setting complete flag (RX79).
18) Reads out the remote station READY flag (RX7B). ←	17) The AJ65BT-D75P2-S3 turns ON the remote station READY flag (RX7B).

16.4.2 Zero point return control

The following shows the relation between the user program on the PC and intelligent device station's I/O operations, and the zero point return control.
(The shaded areas indicate the devices that are actually used.)

*1: When the remote net Ver.2 mode is selected, refer to the figure in Section 4.4.7 (1).
     When the remote net additional mode is selected, refer to the figure in Section 4.4.7 (2).

User Program	CC-Link Ver.2 Board
1) Turns ON the initial data setting request flag (RY79).	2) Turns ON the initial data setting request flag (RY79) on the AJ65BT-D75P2-S3.
4) Reads out the initial data setting complete flag (RX79).	3) The AJ65BT-D75P2-S3 turns ON the initial data setting complete flag (RX79).
5) With the initial data setting complete flag (RX79) ON, writes start No. to the Axis 1 positioning start No. setting area (RWw0) and Axis 2 positioning start No. setting area (RWw8).	6) Writes the start No. to the Axis 1 positioning start No. setting area (RWw0) and Axis 2 positioning start No. setting area (RWw8) of the AJ65BT-D75P2-S3.
7) Turns OFF the initial data setting request flag (RY79).	8) The AJ65BT-D75P2-S3 turns OFF the initial data setting request flag (RY79).
10) Reads out the initial data setting complete flag (RX79) and the remote station READY flag (RX7B).	9) The AJ65BT-D75P2-S3 turns OFF the initial data setting complete flag (RX79), and turns ON the remote station READY flag (RX7B).
11) With the initial data setting complete flag (RX79) OFF and the remote station READY flag (RX7B) ON, turns ON the Axis 1 servo ON flag (RY20) and Axis 2 servo ON flag (RY40).	12) Turns ON the Axis 1 servo ON flag (RY20) and Axis 2 servo ON flag (RY40) of the AJ65BT-D75P2-S3.
13) Turns ON the Axis 1 positioning start flag (RY10) and Axis 2 positioning start flag (RY11).	14) Turns ON the Axis 1 positioning start flag (RY10) and Axis 2 positioning start flag (RY11) on the AJ65BT-D75P2-S3. The AJ65BT-D75P2-S3 starts the zero point return operation.

Parameters set in the sample program

	For zero point return	
	Basic parameters	Extended parameters
Axis 1	Zero point return method: 5 (counting system 2 (zero-point signal is not used)) Zero point return direction: 0 (forward direction) Zero point address: 0 Zero point return speed: 2000 Creep speed: 1000 Zero point return retry: 0 (no retry)	Zero point return dwell time: 0 Displacement setting after near-point dog: 1000 Zero point return acceleration time selection: 0 Zero point return deceleration time selection: 0 Zero point shift amount: 0 Zero point return torque limit value: 300 Speed designation during zero point shift: 0 Dwell time during zero point return retry: 0
Axis 2	Zero point return method: 5 (counting system 2 (zero-point signal is not used)) Zero point return direction: 0 (forward direction) Zero point address: 0 Zero point return speed: 2000 Creep speed: 1000 Zero point return retry: 0 (no retry)	Zero point return dwell time: 0 Displacement setting after near-point dog: 1000 Zero point return acceleration time selection: 0 Zero point return deceleration time selection: 0 Zero point shift amount: 0 Zero point return torque limit value: 300 Speed designation during zero point shift: 0 Dwell time during zero point return retry: 0

16.4.3 Positioning control

The following shows the relation between the user program on the PC and intelligent device station's I/O operations, and positioning control.
(The shaded areas indicate the devices that are actually used.)

＊1: When the remote net Ver.2 mode is selected, refer to the figure in Section 4.4.7 (1).
   When the remote net additional mode is selected, refer to the figure in Section 4.4.7 (2).

User Program	CC-Link Ver.2 Board
1) Turns ON the Axis 1 servo ON flag (RY20) and the Axis 2 servo ON flag (RY40).	2) Turns ON the Axis 1 servo ON flag (RY20) and the Axis 2 servo ON flag (RY40) on the AJ65BT-D75P2-S3.
3) Writes start No. to the Axis 1 positioning start No. setting area (RWw0) and Axis 2 positioning start No. setting area (RWw8).	4) Writes the start No. to the Axis 1 positioning start No. setting area (RWw0) and Axis 2 positioning start No. setting area (RWw8) on the AJ65BT-D75P2-S3.
5) Turns ON the Axis 1 positioning start flag (RY10) and Axis 2 positioning start flag (RY11).	6) Turns ON the Axis 1 positioning start flag (RY10) and Axis 2 positioning start flag (RY11) on the AJ65BT-D75P2-S3. The AJ65BT-D75P2-S3 starts zero point return operation.
	7) The AJ65BT-D75P2-S3 starts positioning operations for axes 1 and 2, and turns ON the Axis 1 start complete flag (RX01), Axis 1 BUSY flag (RX04), Axis 2 start complete flag (RX02) and Axis 2 BUSY flag (RX05).
9) Reads out the Axis 1 BUSY flag (RX04) and Axis 2 BUSY flag (RX05).	8) When positioning of Axis 1 or 2 is completed, the AJ65BT-D75P2-S3 turns OFF the Axis 1 BUSY flag (RX04) or Axis 2 BUSY flag (RX05) respectively.
10) With the Axis 1 BUSY flag (RX04) OFF, turns OFF the Axis 1 positioning start flag (RY10). With the Axis 2 BUSY flag (RX05) OFF, turns OFF the Axis 2 positioning start flag (RY11).	11) Turns OFF the Axis 1 positioning start flag (RY10) and Axis 2 positioning start flag (RY11) on the AJ65BT-D75P2-S3.
13) Reads out the Axis 1 start complete flag (RX01) and Axis 2 start complete flag (RX02).	12) The AJ65BT-D75P2-S3 turns OFF the Axis 1 start complete flag (RX01) and Axis 2 start complete flag (RX02).
14) With the Axis 1 start complete flag (RX01) OFF, turns OFF the Axis 1 servo ON flag (RY20). With the Axis 2 start complete flag (RX02) OFF, turns OFF the Axis 2 servo ON flag (RY40).	15) Turns OFF the Axis 1 servo ON flag (RY20) and Axis 2 servo ON flag (RY40) on the AJ65BT-D75P2-S3.

Parameters set in the sample program

		For zero point return
Axis 1	No. 1	Positioning identifier setting: 0x200 (INC linear 1) M code setting: 0 Dwell time: 0 Command speed: 0x30D40 (20000) Positioning address: 1000 Arc address: 0
Axis 2	No. 1	Positioning identifier setting: 0x200 (INC linear 1) M code setting: 0 Dwell time: 0 Command speed: 0x30D40 (20000) Positioning address: 1000 Arc address: 0

16.4.4 JOG operation control

The following shows the relation between the user program on the PC and intelligent device station's I/O operations, and jog operation control.
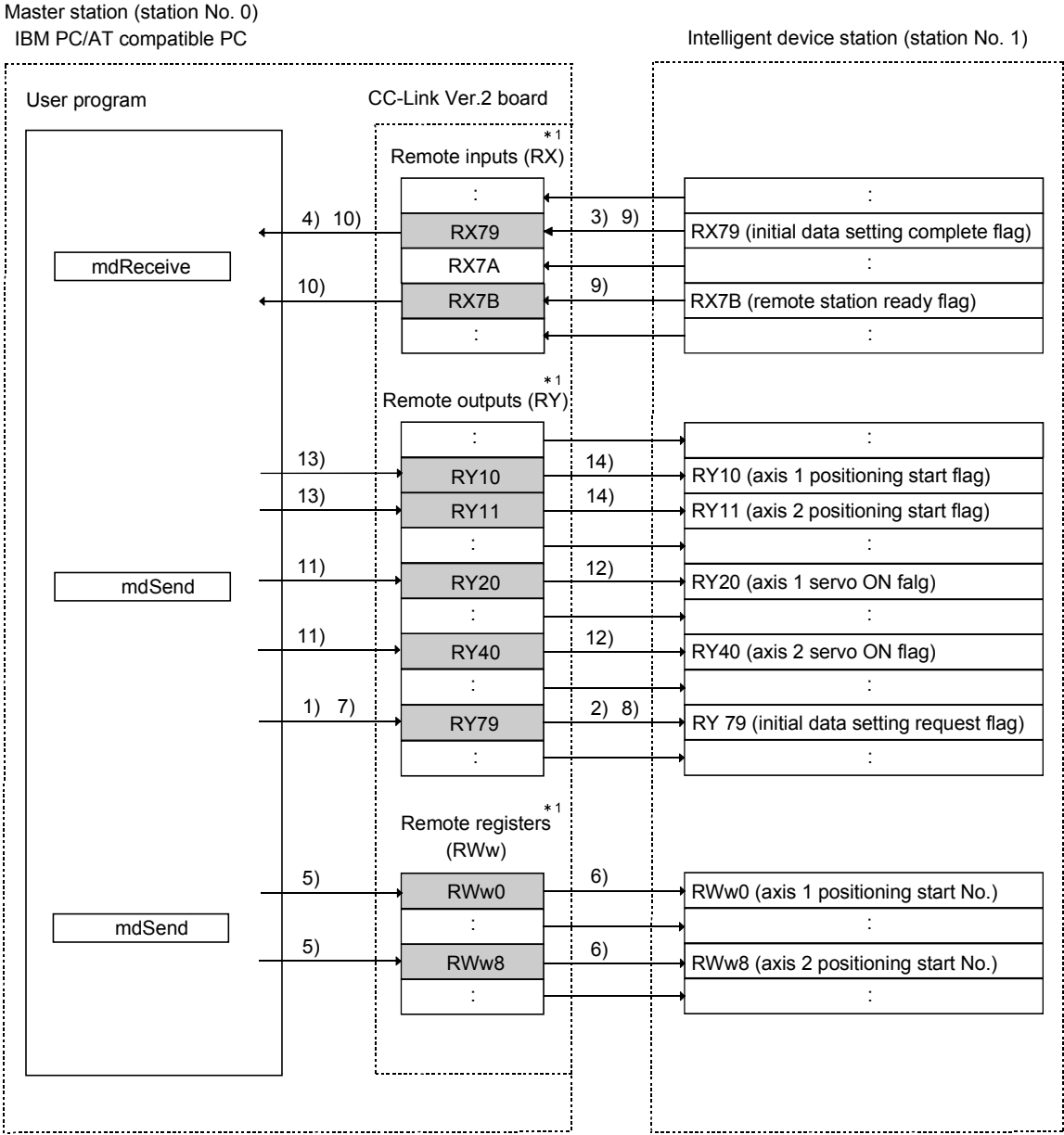(The shaded areas indicate the devices that are actually used.)

∗1: When the remote net Ver.2 mode is selected, refer to the figure in Section 4.4.7 (1).
     When the remote net additional mode is selected, refer to the figure in Section 4.4.7 (2).

User Program	CC-Link Ver.2 Board
1) Turns ON the Axis 1 servo ON flag (RY20).	2) Turns ON the Axis 1 servo ON flag (RY20) on the AJ65BT-D75P2-S3.
3) Turns ON the Axis 2 servo ON flag (RY40).	4) Turns ON the Axis 2 servo ON flag (RY40) on the AJ65BT-D75P2-S3.
5) Writes the JOG speed to the Axis 1 JOG speed setting area (RWw6, RWw7).	6) Writes the JOG speed to the Axis 1 JOG speed setting area (RWw6, RWw7) of the AJ65BT-D75P2-S3.
7) Writes the JOG speed to the Axis 2 JOG speed setting area (RWw14, RWw15).	8) Writes the JOG speed to the Axis 2 JOG speed setting area (RWw14, RWw15) of the AJ65BT-D75P2-S3.
9) Turns ON the Axis 1 forward run JOG start flag (RY16).	10) Turns ON the Axis 1 forward run JOG start flag (RY16) of the AJ65BT-D75P2-S3, and starts JOG operation.
11) Turns ON the Axis 2 forward run JOG start flag (RY18).	12) Turns ON the Axis 2 forward run JOG start flag (RY18) of the AJ65BT-D75P2-S3, and starts JOG operation.
13) To stop JOG operation of Axis 1, turn OFF the Axis 1 forward run JOG start flag (RY16).	14) Turn OFF the Axis 1 forward run JOG start flag (RY16) of the AJ65BT-D75P2-S3 to stop the JOG operation.
15) To stop JOG operation of Axis 2, turn OFF the Axis 2 forward run JOG start flag (RY18).	16) Turn OFF the Axis 2 forward run JOG start flag (RY18) of the AJ65BT-D75P2-S3 to stop JOG operation.
17) Turns OFF the Axis 1 servo ON flag (RY20).	18) Turns OFF the Axis 1 servo ON flag (RY20) of the AJ65BT-D75P2-S3.
19) Turns OFF the Axis 2 servo ON flag (RY40).	20) Turns OFF the Axis 2 servo ON flag (RY40) of the AJ65BT-D75P2-S3.

16.5 Executing the Data Link

To start the data link, first power on the intelligent device station, and then the master station.

16.5.1 Checking the data link status

The following describes how to check the operation status of the master station and intelligent device stations under normal data link condition.

(1) Checking the master station
Check the operation status of the master station.

(a) Checking by the LED indication on the CC-Link Ver.2 board
Make sure that the LED status is as follows:

●:ON   ○:OFF

The CC-Link Ver.2 board is operating normally.

Data are being transmitted.

No error has occurred.

Data are being received.

(b) Checking by the CC-Link Ver.2 Utility
Check that the Board detail information on the CC-Link Ver.2 Utility is displayed as shown below.

In data link: Normal data link is being performed.

Normal: The CC-Link Ver.2 board is operating normally.

ON (green): The CC-Link Ver.2 board is operating normally.

OFF: No error has occurred.

(2) LED displays of the Intelligent device station
     Be sure that the LED displays show the following status:

AJ65BT-D75P2-S3		
	PW ●	24 V DC is being supplied.
	RUN ●	The module is normally.
	L RUN ●	The data link is being executed normally.
	SD ●	Sending data.
	RD ●	Receiving data.
	L ERR. ○	No error has occurred.

● : On   ○ : Off

16.5.2 Confirming the operation with a user program

Using a user program, confirm that the data link is being executed normally.
Use of the sample program allows the operation check in the following system
configuration. (For details on the location where the sample program is stored, refer to
Section 11.9.)
With the sample program, the initialization, zero point return, positioning and jog
operation can be performed.

Program execution
・ Initialization
・ Zero point return
・ Positioning
・ JOG operation

Master station

IBM PC/AT
compatible PC

+

Q80BD-J61BT11N
Q81BD-J61BT11

Terminal resistor

Initialization
operation

Occupies 4 station

Intelligent device station (station No. 1)

AJ65BT-D75P2-S3

Positioning module

Terminal
resistor

Zero point return operation
Positioning operation
JOG operation

Servo
amplifier

Motor

Servo
amplifier

Motor

MEMO

17 TROUBLESHOOTING

This chapter describes the details of the problems that may occur in the CC-Link System. It presents a list of check items and corrective actions to take for possible problems.

17.1 Hardware Troubleshooting
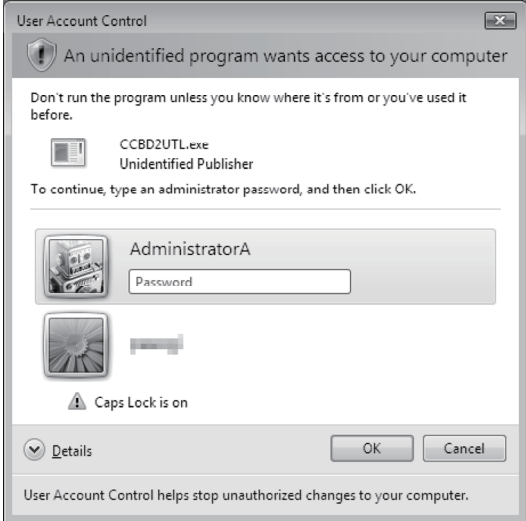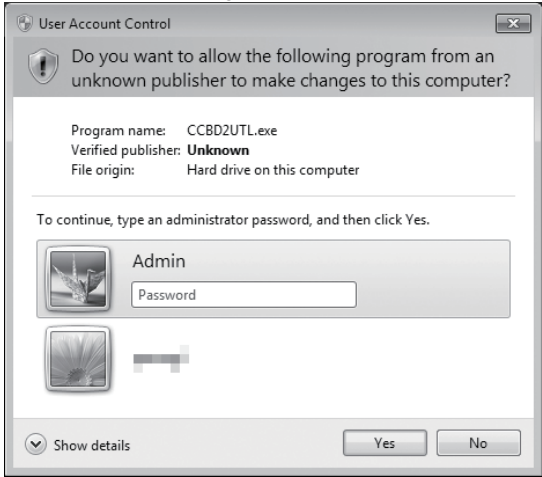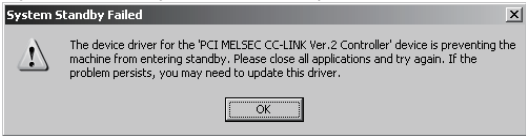
The following shows how to remedy errors that may occur on the CC-Link Ver.2 board hardware.

17.1.1 Verification of problem occurrence

When a problem occurs on the CC-Link Ver.2 board, check Table 17.1 to find the appropriate section to go to.

Table 17.1 Troubleshooting flow by the problem occurrence type

No.	Error detail		Cause determination method/Action
1	The system did not operate normally when the CC-Link Ver.2 board was started up.	The RUN LED on the CC-Link Ver.2 board is flashing.	17.1.2 "When the RUN LED on the CC-Link Ver.2 board is flashing."
		The RUN LED on the CC-Link Ver.2 board is not flashing.	17.1.3 "When the RUN LED on the CC-Link Ver.2 board is not flashing."
2	The RUN LED is flashing after the CC-Link Ver.2 board startup.		17.1.2 "When the RUN LED on the CC-Link Ver.2 board is flashing."
3	Errors are displayed on event viewer.		17.1.4 "List of messages of error events that may occur when starting the driver."
4	The software is not normally installed. The setup screen remains even after selecting to restart the system at the completion of the utility installation.		1) Check if the display settings on the [Device Manager] or other relevant functions are correct, and install an appropriate display driver. Or update the Windows operating system. 2) Read the precautions described in Section 8.4.1 (2), and perform the operations described in Section 8.4.1 (3) (c).
5	Uninstallation is not executed normally. • Although the message "SW□DNC-CCBD2-B has been successfully uninstalled from your machine" is displayed on the screen, the uninstallation is not complete.		1) Logon as a user with administrator authority and execute the uninstallation. 2) Check if the display settings on the [Device Manager] or other relevant functions are correct, and install an appropriate display driver. Or update the Windows operating system. 3) Read the precautions described in Section 8.4.2 (2), and perform the operations described in Section 8.4.2 (4).
6	Error message "An error occurred in writing." is displayed in utility		Logon as a user with administrator authority and execute utility (Refer to POINT in Chapter 9.) or reinstall the operating system.

17

No.	Error detail	Cause determination method/Action
7	The password is requested on the User Account Control screen when the utility is activated. <Using Windows Vista® /Windows® 2008> **User Account Control** An unidentified program wants access to your computer Don't run the program unless you know where it's from or you've used it before. CCBD2UTL.exe Unidentified Publisher To continue, type an administrator password, and then click OK. AdministratorA Password ⚠ Caps Lock is on Details OK Cancel User Account Control helps stop unauthorized changes to your computer. <Using Windows® 7> **User Account Control** Do you want to allow the following program from an unknown publisher to make changes to this computer? Program name: CCBD2UTL.exe Verified publisher: **Unknown** File origin: Hard drive on this computer To continue, type an administrator password, and then click Yes. Admin Password Show details Yes No	When the utility is activated, and if the User Account Control screen is displayed requesting a selection of user with administrator authority and password entry ∗1, the user who is logging on to the system does not have an administrator authority. Log off the system and login again as a user with administrator authority, and activate the utility. ∗2
8	System standby error is displayed. **System Standby Failed** ⚠ The device driver for the 'PCI MELSEC CC-LINK Ver.2 Controller' device is preventing the machine from entering standby. Please close all applications and try again. If the problem persists, you may need to update this driver. OK	Standby mode of operating system is not supported for CC-Link Ver.2 board. Depending on a personal computer, standby mode may be set by the power switch operation setting or the uninterruptible power system (UPS) setting. Disable the standby mode on the Control Panel of the operating system.

∗1: If only one user account with administrator authority is available, the User Account Control screen requests the password entry of its user only.

∗2: For details on how to prevent this screen from being displayed, refer to Appendix 5.

17.1.2 When the RUN LED on the CC-Link Ver.2 board is flashing

The following table shows how to identify the error according to the ERR, SD or RD LED status when the RUN LED on the CC-Link Ver.2 board is flashing.

Table 17.2 Troubleshooting for each lit LED

LED	Status	Error	Cause	Corrective Action
ERR.	On	OS startup error	• Breakdown or malfunction of the computer in use. *[1] • CC-Link Ver.2 board failure. • CC-Link Ver.2 board driver is not installed. • Competition or fault with other optional board(s).	(1) Check if the CC-Link Ver.2 board driver is installed. (2) Remove the CC-Link Ver.2 board and check if the OS starts up normally. (3) Replace other optional board(s) or change installation positions for board(s). (4) Reinstall other optional board driver(s), or reset the IRQ and memory addresses. (5) Reinstall the OS, or replace the computer. (6) Consult your local Mitsubishi representative.
SD	On	Driver response error	• CC-Link Ver.2 board driver is not installed. • The watchdog timer error has occurred. • CC-Link Ver.2 board failure.	(1) Check if the CC-Link Ver.2 board driver is installed. (2) Adjust the watchdog timer setting. (Refer to Section 9.2.5 and 17.4.) (3) Consult your local Mitsubishi representative.
RD	On	PCI bus error	• Poor contact on the CC-Link Ver.2 board • CC-Link Ver.2 board failure • Malfunction of the PC in use	(1) Check if the CC-Link Ver.2 board is firmly inserted into the PCI slot. (2) Consult your local Mitsubishi representative.

＊1:The error frequency may depend on the condition of the computer or OS.

17.1.3 When the RUN LED on the CC-Link Ver.2 board is not flashing

The following is a flowchart showing how to do when the CC-Link Ver.2 board does not start up properly with the RUN LED not flashing and the error cannot be identified.

＊1:The error frequency may depend on the condition of the computer or OS.

1)

2)

```
Is a driver
message displayed
on event viewer of the
management
tool?
```
—— YES ——

NO

```
Start the monitor function (utility).
```

```
Check switch and other settings
according to the error description
in event viewer.
```

```
Did the monitor
function (utility) start
normally?
```
—— NO ——

YES

```
Remove other optional board(s) and
leave only the
Q80BD-J61BT11N/Q81BD-J61BT11.
```

```
Did the monitor
function (utility) start
normally?
```
—— YES ——

NO

```
Check the I/O, IRQ and memory
address settings of other option
boards and set them without
duplication.
```

```
Is the correct
number of installed
Q80BD-J61BT11N/Q81BD-J61BT11
boards displayed?
```
—— NO ——

YES

```
END
```

```
Check the following items.
(1) Check that other drivers, such as the USB driver,
    are operating correctly.
(2) Set the I/O, IRQ, and memory address of the
    Q80BD-J61BT11N/Q81BD-J61BT11 to values
    different from the other drivers such as the USB
    driver, and check whether operation is correct.
```

```
Reinstall other optional board(s).
```

NO —— ```OK?```

YES

```
Consult your local Mitsubishi
representative.
```

```
END
```

```
END
```

```
Have the
operating system and
Q80BD-J61BT11N/Q81BD-J61BT11
operated normally?
```
YES ——

NO

```
(1) Changing the installation slot
    positions for each board.
(2) Install other optional board(s) only,
    reinstall drivers of the installed
    board(s).
```

```
Have the
operating system and
Q80BD-J61BT11N/Q81BD-J61BT11
operated normally?
```
NO ——

YES

```
Is the
operation available on
another PC?
```
—— YES ——

NO

```
Consult your local Mitsubishi
representative.
```

```
END
```

17.1.4 List of messages of error events that may occur when starting the driver

Table 17.3 lists the error messages that are displayed in event viewer.

Table 17.3 List of error displayed in event viewer

Event ID (HEX)	Error message	Corrective action
256 (100H)	Because the error had occurred in the during starting of the device, the device was not able to be executed.	Reinstall the driver software. If the error persists, reinstall Operating System.
257 (101H)	The I/F board was not found.	Uninstall and reinstall the CC-Link Ver.2 board.
258 (102H)	There is no response from hardware.	Replace the CC-Link Ver.2 board.
259 (103H)	The board more than the maximum number of sheets which was able to be installed was detected.	Remove the boards exceeding the maximum.
262 (106H)	Failed to link the device name.	Check that the CC-Link Ver.1 board is not installed. Reinstall Operating System.
268 (10CH)	An error occurred during the receive process.	Check the programs of the personal computer and programmable controller that requested the processing to this personal computer.
269 (10DH)	An error occurred during transmission processing.	
279 (117H)	An error occurred when Registry Database wrote out.	1) This error occurs when the CC-Link Ver.2 board driver is installed first. Install SW1DNC-CCBD2-B, then restart the PC to confirm that this error does not occur. 2) Increase the system memory and disk capacities.
280 (118H)	The request which was not able to be processed was received from remote station.	Check the programs of the personal computer and programmable controller that requested the processing to this personal computer.
281 (119H)	The retry transmission was generated by the transmission processing.	No corrective action for this error. (Owing to the event viewer that is generated when data are transmitted to other stations)
282 (11AH)	Failed to map the I/O port.	The I/O port is also used by another resource. Remove other option boards.
283 (11BH)	The Dual Port Memory Area of the I/F board conflicts with the other Hardware's one.	Remove other option boards.
284 (11CH)	The IRQ of the I/F board conflicts with the other Hardware's one.	Remove other option boards.
286 (11EH)	Failed to allocate the Memory Area.	Increase the system memory.
287 (11FH)	Link Parameter is nothing or has abnormal data.	Reset the parameter.
288 (120H)	A WDT error occurred.	Remove other option boards. Take the measures for WDT error occurrence. (Refer to Section 17.4)
290 (122H)	The board number of the I/F board conflicts.	Do not use duplicate board numbers.
291 (123H)	Failed to map the Dual Port Memory.	Remove other option boards.
293 (125H)	Failed to connect the Interrupt.	Remove other option boards.
294 (126H)	The I/O port of the I/F board conflicts with the other hardware's one.	Remove other option boards. *1

Event ID (HEX)	Error message			Corrective action
295 (127н)	The Board WDT error had occurred.			It might be failed CC-Link Ver.2 board. Consult your local Mitsubishi representative.
296 (128н)	The CLOCK STOP error had occurred.			
297 (129н)	The Target Abort error had occurred on the PCI bus.			
298 (12Aн)	The Data Parity error had occurred on the PCI bus.			
305 (131н)	Shift to the sleep or the hibernate was detected.			Change the setting of Power Options to prevent the system from transitioning to sleep or hibernate.
1281 (501н)	Initialization of the CC-Link board has failed.	DUMP value	Error description (details)	—
		01h	There was no response from hardware.	Replace the CC-Link Ver.2 board.
		67h 68h	Duplicate IRQ or memory assignment. *2	Remove other option boards.
		03h	There was no response from hardware.	Replace the CC-Link Ver.2 board.
		04h 21h	Handshaking with the shared memory area has failed.	Restart. If the error persists, replace the board.
		66h	There was no response from hardware.	Replace the CC-Link Ver.2 board.

DUMP value ....Value of the first 1 byte in the detailed data description area

＊1: When this event error occurs on the event viewer of the operating system (refer to Section 2.2.1), change the BIOS Setup setting as follows and reboot the PC.

  (BIOS Setup items)
   • Plug & Play O/S: [YES] → [No]
   • Reset Configuration Data: [No] → [YES]

＊2: This event error may occur when the PCI bus controller is not functioning correctly. This error may also occur if the USB driver is not functioning correctly. In this case, reinstall the USB driver and make sure that it functions correctly.

17.2 Programming Troubleshooting

17.2.1 Error codes when executing functions

When an error occurs during the execution of a function, the error code that is returned will be used as a return value.
The table 17.4 lists the error description and corrective actions to take for each of the return values:

Table 17.4 List of error codes when executing functions

Return value (HEX)	Error description	Corrective action
0	Normal completion	—
1	Driver not started The driver has not been started. The same interrupt number and I/O address as those of another board are used.	Correct the error occurred when starting the driver. Check the board settings.
2	Board response error A timeout has occurred while waiting for a response to the corrective action.	Review the operation status and board loading conditions of the access station. Retry with a user program.
65 (41H)	Channel error An unregistered channel number was designated.	Check the channel number.
66 (42H)	Already open error The designated channel has already been open.	Open only once.
67 (43H)	Already closed error The designated channel has already been closed.	Close only once.
68 (44H)	Path error A path other than for an open line was set.	Set the path to the station number that has an open line.
69 (45H)	Unsupported function execution error A function which is not supported by the specified station was executed.	Check the channel number, network number, and station number. Check if the function is supported by the specified station.
70 (46H)	Station number designation error The designated station number is incorrect. A process that should have been requested to other station was requested to own station. Or, the station number corresponds to own station (0xFF) but the network number is not 0.	Correct the designation of the station numbers in a user program.
71 (47H)	Receiving data error (when RECV is requested) Data has not been received.	Wait until data is received.
77 (4DH)	Memory allocation error Sufficient memory could not be allocated.	End all other application programs that are currently running. Check if the system is operating normally. Restart the system. Increase the minimum working set area of the PC. ∗1
78 (4EH)	Timeout error during mode setting Mode setting was attempted but failed due to timeout.	Make sure that the dual-port memory is not used by another board, and restart. Hardware failure.
79 (4FH)	Software setting data error Argument parameters were not set correctly during software setting.	Check the contents of the argument parameters in the software setting data.
81 (51H)	Startup source channel response error (when SEND is requested) A response error when SEND is requested is abnormal.	Retry. Check if the system is operating normally. Restart the system.
85 (55H)	Channel number error (when RECV is requested) Channel number error.	Check the channel number used when RECV is requested.
100 (64H)	Accessing own station board or requesting SEND An access request was issued to the own station board while accessing the own station board.	Retry.
101 (65H)	Routing parameter error The routing parameters are not set.	Correct the routing parameters.

Return value (HEX)	Error description	Corrective action
102 (66H)	Data sending error Data sending has failed.	Retry. Check if the system is operating normally. Restart the system.
103 (67H)	Data receiving error Data receiving has failed.	Retry. Check if the system is operating normally. Restart the system.
129 (81H)	Device type error The designated device type is invalid.	Check the device type.
130 (82H)	Device number error The designated device number is out of range. A device number other than a multiple of 8 was designated for bit device designation.	Check the device number.
131 (83H)	Number of device points error The designated number of points is out of device range. A device number other than a multiple of 8 was designated for bit device designation.	Check the size.
132 (84H)	Number of write bytes error The designated number of bytes to be written was out of range.	Set the number of bytes to be written within the range.
133 (85H)	Link parameter error The link parameters are corrupted. The total number of slave stations is 0 in a link parameter. Link parameter's fixed pattern is corrupted. Link parameter's sum check is corrupted.	Reset the link parameters.
136 (88H)	Random write designation error A value other than 0 to 2 was designated for random read.	Correct the setting value to 0 to 2.
215 (D7H)	Receiving data length error Receiving data length or byte length exceeds the range.	Retry. Check the cable.
	The request data buffer length exceeded the limit The request data length exceeded the request data area.	Make the request data smaller.
224 (E0H)	PC number error The request destination is not found.	Correct the station number.
225 (E1H)	Processing mode error A processing code that could not be processed by the request destination's ACPU was set. (This is checked by the request destination's ACPU.)	Review the request destination's ACPU and processing codes.
227 (E3H)	Other data error Data such as the address, head step or number of shifts of the request data was incorrect.	Correct the request data.
228 (E4H)	Link designation error A processing code that could not be processed by the request destination station was set. (This is checked by the request destination's link module.)	Check the request destination's station number and processing codes.
1280 (500H)	Own board memory access error	Check the switch settings of the own board and move the memory address to an area that is not affected by other board. Change the memory access setting to 16 bits if it is set to 8 bits.
1281 (501H)	Cannot access the I/O port	Check the I/O port address setting. Perform a self-loopback test of the board and check hardware.
4110 (100EH)	DLL non-load error	Exit the program and restart the PC. Setup the package again. Consult with the dealer regarding the problem.
8204 (200CH)	Request cancel	
8205 (200DH)	Drive name error	
8206 (200EH)	First step error	
8207 (200FH)	Parameter type error	

Return value (HEX)	Error description	Corrective action
8208 (2010$_H$)	File name error	Exit the program and restart the PC. Setup the package again. Consult with the dealer regarding the problem.
8209 (2011$_H$)	Registering/release/set status error	
8210 (2012$_H$)	Detailed condition division error	
8211 (2013$_H$)	Step condition error	
8212 (2014$_H$)	Bit device condition error	
8213 (2015$_H$)	Parameter setting error	
8215 (2017$_H$)	Keyword error	
8216 (2018$_H$)	Read/write flag error	
8217 (2019$_H$)	Refresh method error	
8218 (201A$_H$)	Buffer access method error	
8219 (201B$_H$)	Start mode/stop mode error	
8220 (201C$_H$)	Written clock data error	
8221 (201D$_H$)	Online data write error	
8223 (201F$_H$)	Trace time error	
8224 (2020$_H$)	First I/O number error	
8225 (2021$_H$)	First address error	
8226 (2022$_H$)	Pattern error	
8227 (2023$_H$)	SFC block number error	
8228 (2024$_H$)	SFC step number error	
8229 (2025$_H$)	Step number error	
8230 (2026$_H$)	Data error	
8231 (2027$_H$)	System data error	
8232 (2028$_H$)	TC set value number error	
8233 (2029$_H$)	Clear mode error	
8234 (202A$_H$)	Signal flow error	
8235 (202B$_H$)	Version administration error	
8236 (202C$_H$)	Module has been registered	
8237 (202D$_H$)	PI type error	
8238 (202E$_H$)	PI No error	
8239 (202F$_H$)	PI number error	

Return value (HEX)	Error description	Corrective action
8240 (2030H)	Shift error	Exit the program and restart the PC. Setup the package again. Consult with the dealer regarding the problem.
8241 (2031H)	File type error	
8242 (2032H)	Specified module error	
8243 (2033H)	Error check flag error	
8244 (2034H)	Step RUN-operation error	
8245 (2035H)	Step RUN data error	
8246 (2036H)	Step RUN-time error	
8247 (2037H)	Program RUN inside writing error to E^{2}ROM	
8248 (2038H)	Clock data read/write error	
8249 (2039H)	Trace non-completion	
8250 (203AH)	Registration clearness flag error	
8251 (203BH)	Operation error	
8252 (203CH)	The number of station error	
8253 (203DH)	The number of repeat error	
8254 (203EH)	The acquisition data selection error	
8255 (203FH)	The number of SFC cycle error	
8258 (2042H)	The scheduled time setting error	
8259 (2043H)	Function count error	
8260 (2044H)	System information error	
8262 (2046H)	Function number error	
8263 (2047H)	RAM operation error	
8264 (2048H)	Boot former ROM forwarding failure	
8265 (2049H)	Boot former transfer mode specification error	
8266 (204AH)	Not enough memory	
8267 (204BH)	Backup drive (former boot drive) ROM error	
8268 (204CH)	Block size error	
8269 (204DH)	RUN-time detaching error	
8270 (204EH)	Module has already registered	
8271 (204FH)	Password registration data full error	
8272 (2050H)	Password unregistration error	

Return value (HEX)	Error description	Corrective action
8273 (2051H)	Remote password error	Exit the program and restart the PC. Setup the package again. Consult with the dealer regarding the problem.
8274 (2052H)	IP address error	
8275 (2053H)	Error (argument when requesting) outside time-out value range	
8276 (2054H)	Instruction cast undetection	
8277 (2055H)	Trace execution type error	
8278 (2056H)	Version error	
16384 to 20479 (4000H to 4FFFH)	Errors detected by the access target CPU.	Refer to the user's manual of the access target CPU module.
16386 (4002H)	A request that could not be processed was received.	Change the request destination.
16432 (4030H)	The designated device type does not exist.	Check the designated device type.
16433 (4031H)	The designated device number is out of range.	Check the designated device number.
16448 (4040H)	A module does not exist.	Do not issue the request that generated the error to the designated special module.
16449 (4041H)	The number of device points is out of range.	Check the head address and number of access points, and access the devices within the existing range.
16450 (4042H)	Corresponding module is abnormal.	Check if the designated module is operating normally.
16451 (4043H)	A module does not exist at the designated location.	Check the start I/O number of the designated module.
28672 to 32767 (7000H to 7FFFH)	Errors detected by intelligent function modules such as the serial communication module.	Refer to the user's manual of the access target intelligent function module.
40577 (9E81H)	Device type error The device type designated for the request destination station is invalid. (This is checked by the request destination's link module).	Check the device type.
40578 (9E82H)	Device number error The device number designated for the request destination station is out of range. A device number other than a multiple of 8 was designated for bit device designation. (This is checked by the request destination's link module).	Check the device number.
40579 (9E83H)	Error in the number of devices points The number of points set for the destination station is out of range. A device number other than a multiple of 8 was designated for bit device designation. (This is checked by the request destination's link module).	Check the size.
-1 (FFFFH)	Bus error The designated bus is invalid.	Check the bus that was returned by the mdOpen function.
-2 (FFFEH)	Device number error The designated device number is out of range. When a bit device was designated, the device number was not a multiple of 8.	Check the head device number for the designated device.
-3 (FFFDH)	Device type error The designated device type is invalid.	Check if the device type used is found in the device list.
-4 (FFFCH)	CPU error An invalid station was designated.	Check the status of the communication station. Check the designated station number.
-5 (FFFBH)	Size error The device number and size exceeded the device range. Access was attempted using an odd numbered device. The device number and size exceeded the range for the same block.	Check the designated device size. Check the device number and size.

Return value (HEX)	Error description	Corrective action
-6 (FFFA_H)	Number of blocks error The number of blocks designated in dev [0] for device random read/write is out of range.	Check the number of blocks designated in dev [0].
-8 (FFF8_H)	Channel number error The channel number designated in the mdOpen function is invalid.	Check the designated channel number.
-11 (FFF5_H)	Insufficient buffer area The read area size for read data storage array variables is too small.	Check the read size and read data storage destination size.
-12 (FFF4_H)	Block error The block number of the designated extension file register is invalid.	Check the block number (device type) of the extension file register.
-13 (FFF3_H)	Write protect error The block number of the designated extension file register duplicates with the write protect area of the memory cassette.	Check the block number (device type) of the extension file register. Check the write protection DIP switch of the access destination's memory cassette.
-14 (FFF2_H)	Memory cassette error No memory cassette is installed in the accessed CPU, or an incorrect memory cassette is loaded.	Check the memory cassette of the access destination.
-15 (FFF1_H)	Read area length error The read area size for read data storage array variables is too small.	Check the read size and read data storage destination size.
-16 (FFF0_H)	Station number/network number error The station number/network number is out of range.	Check the designated station number/network number.
-17 (FFEF_H)	All-station/group number designation error All-station/group number was designated for a function that does not support all-station/group number designation. "Arrival acknowledgment" was specified for the device type when using the SEND function with all station specification and group number specification.	Check if the function supports all-station/group number designation. Set "no arrival acknowledgment" for the device type when using the SEND function with all station specification and group number specification.
-18 (FFEE_H)	Remote designation error An undesignated code was designated.	Check the designated code.
-19 (FFED_H)	SEND/RECV channel number error The channel number designated with the SEND/RECV function is out of range.	Check the designated channel number.
-21 (FFEB_H)	Error occurred in gethostbyname ( ) An error occurred in the gethostbyname ( ) function.	Check if the designated host name exists in the HOSTS file.
-24 (FFE8_H)	Timeout error occurred in select ( ) A timeout error occurred in the select ( ) function.	Check if the MGW server service has been started in the server machine.
-25 (FFE7_H)	Error occurred in sendto ( ) An error occurred in the sendto ( ) function.	Check if normal Ethernet communication can be performed with the server machine.
-26 (FFE6_H)	Error ocurred in recvfrom ( ) An error occurred in the recvfrom ( ) function.	
-28 (FFE4_H)	Abnormal response received An abnormal response was received.	
-29 (FFE3_H)	Receiving data length error Too much data was received.	
-30 (FFE2_H)	Sequence number error The received sequence number is abnormal.	Check if normal Ethernet communication can be performed with the server machine.
-31 (FFE1_H)	DLL load error An attempt to load a DLL required to execute functions has failed.	Set up the utility software again.
-32 (FFE0_H)	Another task/thread is occupying the resource and the resource is not released within 30 seconds.	Retry. Memory may be insufficient. Close all other applications that are currently running. Check if the system is operating normally. Restart the system. Exit the program and restart the personal computer.
-33 (FFDF_H)	Invalid access destination error The setting for the communication destination is invalid.	Check if the communication destination is correctly set by the utility.
-34 (FFDE_H)	Registry error An attempt to open the registry has failed.	
-35 (FFDD_H)	Registry read error An attempt to read from the registry has failed.	

Return value (HEX)	Error description	Corrective action
-36 (FFDCH)	Registry write error An attempt to write to the registry has failed.	
-37 (FFDBH)	Communication initialization setting error An attempt to perform initial setting for communication has failed.	Retry. Memory may be insufficient. Close all other applications that are currently running. Check if the system is operating normally. Restart the system.
-38 (FFDAH)	Ethernet communication error An attempt to set an Ethernet communication has failed.	Retry. Check if the communication destination is correctly set by the utility.
-39 (FFD9H)	COM communication setting error An attempt to set a COM communication has failed.	Memory may be insufficient. Close all other applications that are currently running. Check if the system is operating normally. Restart the system.
-41 (FFD7H)	COM control error Control cannot be performed properly in COM communication.	Retry. Check if the system is operating normally. Restart the system.
-42 (FFD6H)	Close error Communication cannot be closed.	
-43 (FFD5H)	ROM operation error A TC setting value was written to the CPU during ROM operation.	Change the TC setting value during RAM operation.
-44 (FFD4H)	LLT communication setting error An attempt to set an LLT communication has failed.	Retry. Check if the communication destination is correctly set by the utility. Memory may be insufficient. Close all other applications that are currently running.
-45 (FFD3H)	Ethernet control error Control cannot be performed properly in Ethernet communication.	Retry. Check if the system is operating normally.
-46 (FFD2H)	USB open error Initialization and opening of the USB port failed.	Memory may be insufficient. Close all other applications that are currently running. Check if the system is operating normally. Restart the system.
-47 (FFD1H)	Random read condition unsatisfied error Random read cannot be performed because the random read condition is not satisfied.	Conditioned random read is set from a software such as GX Developer. Wait until the conditions are satisfied. Clear the condition settings.
-48 (FFD0H)	TEL error.	Exit the program and restart the PC. Setup the package again. Consult with the dealer regarding the problem.
-50 (FFCEH)	Maximum open path value error The number of open paths exceeds the maximum value (32).	Close several paths.
-51 (FFCDH)	Exclusive control error An exclusive control error occurred.	Retry. Check if the system is operating normally.
-4096 to -257 (F000H to FEFFH)	Errors detected in the MELSECNET/H, MELSECNET/10 network system.	MELSECNET/10 network system Refer to the MELSECNET/H, MELSECNET/10 network system reference manual.
-16384 to -12289 (C000H to CFFFH)	Errors detected by the Ethernet interface module	Refer to the user's manual of the Ethernet interface module.
-20480 to -16385 (B000H to BFFFH)	Errors detected in the CC-Link system.	Refer to the CC-Link system master/local module user's manual. * Refer to the QJ61BT11N User's Manual for whether the cyclic data can be transmitted to/from stations compatible with CC-Link Ver.2.
-18558 (B782H)	Request destination station number specification error The local station number was specified as the station number of the processing request destination station.	Review the correct request destination station number.
-18560 (B780H)	A transient request was issued to a remote I/O station.	Check the request destination station.
-18575 (B771H)	Other station's dedicated device was accessed to own station.	Check the device type.

Return value (HEX)	Error description	Corrective action
-24957 (9E83H)	Number of device points error The number of points set for the request destination station is out of device range. When a bit device was designated, the number of points was not a multiple of 8. (This is checked by the request destination's link module.)	Check the size.
-24958 (9E82H)	Device number error The device number designated for the request destination station is out of device range. When a bit device was designated, the device number was not a multiple of 8. (This is checked by the request destination's link module.)	Check the device number.
-24959 (9E81H)	Device type error The device type designated for the request destination station is invalid. (This is checked by the request destination's link module.)	Check the device type.
-25056 (9E20H)	Processing code error A processing code that could not be processed by the request destination station was set. (This is checked by the request destination's link module.)	Check the request destination station number and processing codes.
-26334 (9922H)	Board reset error Another process that used the same channel executed a board reset while accessing other station.	Retry.
-26336 (9920H)	Request error for another loop Routing to another loop was performed.	Change the routing request destination to an AnUCPU or QnACPU.
-28141 (9213H)	System sleep error Shift to the sleep or the hibernate was detected.	Reboot the system. Change the setting of Power Options to prevent the system from transitioning to sleep or hibernate.
-28150 (920AH)	Device access error of the data link interrupted station Attempt was made to access the device ranges of a data link interrupted station of the own station devices RX, RY, RWw and RWr, as well as a reserved station.	Data can be read and written, but the validity of the data is not guaranteed.
-28151 (9209H)	APS NO error Invalid response data was received.	Change the device that requested the processing.
-28156 (9204H)	Dual-port memory handshake error	Remove other option boards.
-28158 (9202H)	WDT error	Reset the board. Restart the personal computer. Take the measures for WDT error occurrence. (Refer to Section 17.4.)

*1: Procedures and sample program for increasing the minimum working set area of the PC
The following provides measures for increasing the minimum working set area of the PC when an error of error code 77 occurs due to MD function execution, and its sample program.
The PC board driver runs using the minimum working set area in the memory area reserved in the user program. Some user program may use a large area of the minimum working set area. In such a case, when the minimum working set area for the PC board driver cannot be reserved, an error code 77 is returned.
If this situation occurs, increase the minimum working set area in the user program before executing the MD function. (See the following sample program.)
The minimum working set area of 200KB is reserved at startup of the personal computer.

Sample program
This section gives a processing overview for setting a greater size to the minimum working set and provides sample programs.

(a) Processing overview of sample program
1) Obtain the user program ID by the GetCurrentProcessId function.
2) Using the ID obtained in step 1), obtain the user program handle by the OpenProcess function.
3) The current minimum and maximum working set sizes can be obtained by executing the GetProcessWorkingSetSize function.
4) Set a size greater than the minimum working set obtained in step 3) and execute the SetProcessWorkingSetSize.
5) Release the user program handle by the CloseHandle function.

(b) Sample program: When a program is set by Visual Basic® 5.0, 6.0, .NET2003, .NET2005, .NET2008
The following is a setting example using Visual Basic® .NET2003, .NET2005, .NET2008
(Example of min. working set size 1MB and max. working set size 3MB)
When programming with Visual Basic® 5.0 or 6.0, change the type definition of variables (id, ph, wkmin, wkmax) from Integer to Long.

```
Dim id As Integer           'User program ID variable
Dim ph As Integer           'User program handle variable
Dim wkmin As Integer        'Minimum working set variable
Dim wkmax As Integer        'Maximum working set variable
Dim bret As Boolean         'Return value
'Obtain the user program ID
id = GetCurrentProcessId ()
'Open the user program handle
'PROCESS_SET_QUOTA = 256,PROCESS_QUERY_INFORMATION = 1024
ph = OpenProcess(256 + 1024,False,id)
'Obtain the maximum working set size and minimum working set size of the user program
bret = GetProcessWorkingSetSize(ph,wkmin,wkmax)
'Set the minimum working set size to 1MB (1 * 1024 * 1024= 1048576)
wkmin = 1048576
'Set the maximum working set size to 3MB (3 * 1024 * 1024= 3145728)
wkmax = 3145728
'Change the maximum working set size and minimum working set size of the user program
bret = SetProcessWorkingSetSize(ph,wkmin,wkmax)
'Close the user program handle
bret = CloseHandle(ph)
```

The set sizes shown here are reference sizes. Adjust the sizes in accordance with your system.

(c) Sample program: When setting by Visual C++® 5.0, 6.0, .NET2003, .NET2005, .NET2008
  (Example of min. working set size 1MB and max. working set size 3MB)

```c
#define ERROR   -1
short ChangeWorkingSetSize()
{
    DWORD      dwProcessId;                /*User program ID variable*/
    HANDLE     hProcess;                   /*User program handle variable*/
    DWORD      dwMinimumWorkingSetSize;    /*Minimum working set variable*/
    DWORD      dwMaximumWorkingSetSize;    /*Maximum working set variable*/

    /*Obtain the user program ID*/
    dwProcessId = GetCurrentProcessId();

    /*Open the user program handle*/
    hProcess =
    OpenProcess(PROCESS_SET_QUOTA+PROCESS_QUERY_INFORMATION,FALSE,dwProcessId);
    if(hProcess == NULL){
            /*Error end*/
            return(ERROR);
    }

    /*Obtain the maximum working set size and minimum working set size of the user program */
    if(GetProcessWorkingSetSize(hProcess,&dwMinimumWorkingSetSize,&dwMaximumWorkingSetSize)==0){
            /*Error end*/
            CloseHandle(hProcess);
            return(ERROR);
    }

    /*Set the minimum working set size to 1MB*/
    dwMinimumWorkingSetSize = 1 * 1024 * 1024;
    /*Set the maximum working set size to 3MB*/
    dwMaximumWorkingSetSize = 3 * 1024 * 1024;

    /*Change the maximum working set size and minimum working set size of the user program */
    if(SetProcessWorkingSetSize(hProcess,dwMinimumWorkingSetSize,dwMaximumWorkingSetSize)==0){
            /*Error end*/
            CloseHandle(hProcess);
            return(ERROR);
    }

    /*Close the user program handle*/
    CloseHandle(hProcess);

    /*Normal return*/
    return(0);
```

The set sizes shown here are reference sizes. Adjust the sizes according to your system.

17.3 CC-Link System Troubleshooting

This chapter describes the details of the problems that may occur in the CC-Link System. It presents a list of check items and procedures for possible problems.

17.3.1 Verification of problem occurrence

The following shows the details of check items and procedures for possible problems.

Table 17.5 List of check items when a problem occurs

Description of problem	Check item	Check procedure
The entire system cannot perform data link.	Are there any disconnected cables?	• Check the cable connection visually or with a line test. • Check the line status (SW0090).
	Are terminal resistors connected to the terminal stations of the CC-Link system?	Connect the supplied terminal resistors to the terminal stations at both ends of the CC-Link system.
	Are the correct terminal resistors connected?	Connect the terminal resistors that match the cable type used to the terminal stations located at both ends of the CC-Link system. (Refer to Section 3.3)
	Has an error occurred in the CC-Link Ver.2 board?	Check the error code of the CC-Link Ver.2 board and take a necessary corrective action.
	Are the CC-Link parameters set for the CC-Link Ver.2 board?	Check the contents of the parameters for the CC-Link Ver.2 board.
	Has an error occurred in the master station?	• Check the own station parameter status (SW0068). • Check the switch setting status (SW006A). • Check the loading status (SW0069). • Check to see if the "ERR." LED on the master station is flashing. (Refer to Section 17.3.2)
Cannot receive inputs from a remote I/O station.	Is the corresponding remote I/O station performing data link?	• Check the LED displays on the corresponding remote I/O station. • Check the communication status of the master station with other stations (SW0080 to SW0083).
	Is data read from the correct address of the remote input RX (buffer memory)?	Check the user program.
	Is the correct master station's parameter information area (CPU internal parameters, default parameters) being used?	Check the parameter information (SW0067).
	Is the corresponding remote I/O station number recognized by the master station?	• Check the parameters. • Check the total number of stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).

Description of problem	Check item	Check procedure
Cannot output data from a remote I/O station.	Is the corresponding remote I/O station performing data link?	• Check the LED displays on the corresponding remote I/O station. • Check the communication status of the master station with other stations (SW0080 to SW0083).
	Is data written to the correct address of the remote output RY (buffer memory)?	Check the user program.
	Is the correct master station's parameter information area (CPU internal parameters, default parameters) being used?	Check the parameter information (SW0067).
	Is the corresponding remote I/O station number recognized by the master station?	• Check the parameters. • Check the total number of all stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).
Cannot receive the remote input RX of a remote device station.	Is the corresponding remote device station performing data link?	• Check the LED displays on the corresponding remote device station. • Check the communication status of the master station with other stations (SW0080 to SW0083).
	Is data read from the correct address of the remote input RX (buffer memory)?	Check the user program.
	Is the correct master station's parameter information area (CPU internal parameters, default parameters) being used?	Check the parameter information (SW0067).
	Is the corresponding remote device station number recognized by the master station?	• Check the parameters. • Check the total number of stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).
	Is the remote device station initialization procedure registration being executed?	Check if the remote device station initialization procedure registration instruction (SB000D) is on.

Description of problem	Check item	Check procedure
Cannot turn on/off the remote output RY of a remote device station.	Is the corresponding remote device station performing data link?	• Check the LED displays on the corresponding remote device station. • Check the communication status of the master station with other stations (SW0080 to SW0083).
	Is data read from the correct address of remote output RY (buffer memory)?	Check the user program.
	Is the correct master station's parameter information area (CPU internal parameters, default parameters) being used?	Check the parameter information (SW0067).
	Is the corresponding remote device station number recognized by the master station?	• Check the parameters. • Check the total number of stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).
	Is the remote device station initialization procedure registration being executed?	Check if the remote device station initialization procedure registration instruction (SB000D) is on.
Data cannot be received by the remote register RWr of a remote device station.	Is the corresponding remote device station performing data link?	• Check the LED displays on the corresponding remote device station. • Check the communication status of the master station with other stations (SW0080 to SW0083).
	Is data read from the correct address of the remote register RWr (buffer memory)?	Check the user program.
	Is the correct master station's parameter information area (CPU internal parameters, default parameters) being used?	Check the parameter information (SW0067).
	Is the corresponding remote device station number recognized by the master station?	• Check the parameters. • Check the total number of stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).
	Is the remote device station initialization procedure registration being executed?	Check if the remote device station initialization procedure registration instruction (SB000D) is on.

Description of problem	Check item	Check procedure
Cannot write data to the remote register RWw of a remote device station.	Is the corresponding remote device station performing data link?	• Check the LED displays on the corresponding remote device station. • Check the communication status of the master station with other stations (SW0080 to SW0083).
	Is data read from the correct address of the remote register RWw (buffer memory)?	Check the user program.
	Is the correct master station's parameter information area (CPU internal parameters, default parameters) being used?	Check the parameter information (SW0067).
	Is the corresponding remote device station number recognized by the master station?	• Check the parameters. • Check the total number of stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).
	Is the remote device station initialization procedure registration being executed?	Check if the remote device station initialization procedure registration instruction (SB000D) is on.
Cannot communicate from the master station (remote output RY) to a local station (remote input RX).	Is the corresponding local station performing data link?	• Check the LED displays on the corresponding local station. • Check the communication status of the master station with other stations (SW0080 to SW0083).
	Is data written to the correct address of the remote output RY (buffer memory) of the master station?	Check the user program.
	Is data read from the correct address of the remote input RX (buffer memory) of the local station?	Check the user program.
	Is the corresponding local station number recognized by the master station?	• Check the parameters. • Check the total number of stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).

Description of problem	Check item	Check procedure
Cannot communicate from a local station (remote output RY) to the master station (remote input RX).	Is the corresponding local station performing data link?	• Check the LED displays on the corresponding local station. • Check the communication status of the master station with other stations (SW0080 to SW0083).
	Is data written to the correct address of the remote output RY (buffer memory) of the local station?	Check the user program.
	Is data read from the correct address of the remote input RX (buffer memory) of the master station?	Check the user program.
	Is the corresponding local station number recognized by the master station?	• Check the parameters. • Check the total number of stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).
Cannot communicate from the master station (remote register RWw) to a local station (remote register RWr).	Is the corresponding local station performing data link?	• Check the LED displays on the corresponding local station. • Check the communication status of the master station with other stations (SW0080 to SW0083).
	Do the number of occupied stations set for the local station match the station information of the master station?	
	Is data written to the correct address of the remote register RWw (buffer memory) of the master station?	Check the user program.
	Is data read from the correct address of the remote register RWr (buffer memory) of the local station?	Check the user program.
	Is the corresponding local station number recognized by the master station?	• Check the parameters. • Check the total number of stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).

| Description of problem	Check item	Check procedure
Cannot communicate from a local station (remote register RWw) to the master station (remote register RWr).	Is the corresponding local station performing data link?	• Check the LED displays on the corresponding local station. • Check the communication status of the master station with other stations (SW0080 to SW0083)
	Is data written to the correct address of the remote register RWw (buffer memory) of the local station?	Check the user program.
	Is data read from the correct address of the remote register RWr (buffer memory) of the master station?	Check the user program.
	Is the corresponding local station number recognized by the master station?	• Check the parameters. • Check the total number of stations (SW0070). • Check the maximum communication station number (SW0071). • Check the number of connected modules (SW0072).
	Is the corresponding station set as a reserved station?	• Check the parameters. • Check the reserved station designation status (SW0074 to SW0077).
	Are there any duplicate station numbers?	• Check the station number setting. • Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B).
	Do the settings match?	• Check the installation status (SW0069). • Check the station number duplicate status (SW0098 to SW009B). • Check the installation/parameter matching status (SW009C to SW009F).
The local station does not operate with the specified number of occupied stations.	Is the QJ61BT11 of function version A or the A80BD-J61BT11 set to occupy 2 or 3 stations?	Set the number of occupied stations to 1 or 4.
Cannot stop data link.	Is the data link stop (SB0002) turned on?	Check the user program.
	Has an error occurred?	Check the data link stop result (SW0045).
Cannot restart data link.	Is the data link restart (SB0000) turned on?	Check the user program.
	Has an error occurred?	Check the data link restart result (SW0041).
	Is the corresponding station disconnected?	• Check the cable connection visually or with a line test. • Check the parameters (for local station). • Check the operation status of the programmable controller CPU in the corresponding station.
The remote station/local station/intelligent device station/standby master station does not start up.	Do the parameters for the number of modules and station information match the settings of the modules that do not start up?	Check the parameters.
	Are there any duplicate station numbers?	Check the station number setting.
The local station or standby master station does not start up and the "ERR." LED turns on.	Is 65 or larger station No. set to the local station (including the number of occupied stations)?	Check the station No. setting and parameters of the local station or standby master station.
	Does the mode of the master station match that of the local station or standby master station?	Check the parameters of the master station and local station or standby master station.
	Has the parameter of the master station that will return to the system by the standby master function been rewritten?	Check the parameters of the master station.
Faulty stations cannot be detected.	Is the station set as an error invalid station?	Check the parameters.
	Are there any duplicate station numbers?	Check the station number setting.
Faulty stations are generated depending on the transmission rate.	Can the faulty station be identified using the communication status of other stations (SW0080 to SW0083)?	• Check the switch settings for the faulty station. • Check that the cable is properly wired. • Check that the shield of the cable is grounded. • Connect the terminal resistors that match the cable type used to the terminal stations at both ends of the CC-Link system.
	Can communication be performed normally if the transmission rate is reduced to a lower speed such as 156 kbps?	

Description of problem	Check item	Check procedure
The remote device station is not operating normally.	Are there any errors in the initial settings of the remote device station?	• Check the parameters. • Check the user program.
When multiple remote stations are powered off at the same time at 156 kbps, the "L RUN" LED goes off temporarily.	What is the setting for the number of retries?	• Increase the transmission rate. • Reduce the number of retries.
The A80BD-J61BT11 set to the local station does not operate.	Is the CC-Link Ver.2 compatible A80BD-J61BT11 (ROM version "R" or later) used for the network where the master station is in the remote net Ver.2 mode or remote net additional mode?	• Check the mode of the master station. • Check the ROM version of the A80BD-J61BT11.
The A80BD-J61BT13 does not operate.	Is the CC-Link Ver.2 compatible A80BD-J61BT13 (ROM version "Q" or later) used for the network where the master station is in the remote net Ver.2 mode or remote net additional mode?	• Check the mode of the master station. • Check the ROM version of the A80BD-J61BT13.

17.3.2 Troubleshooting flow when the "ERR." LED on the master station is flashing

(1) When the CC-Link Ver.2 board is used as the master board
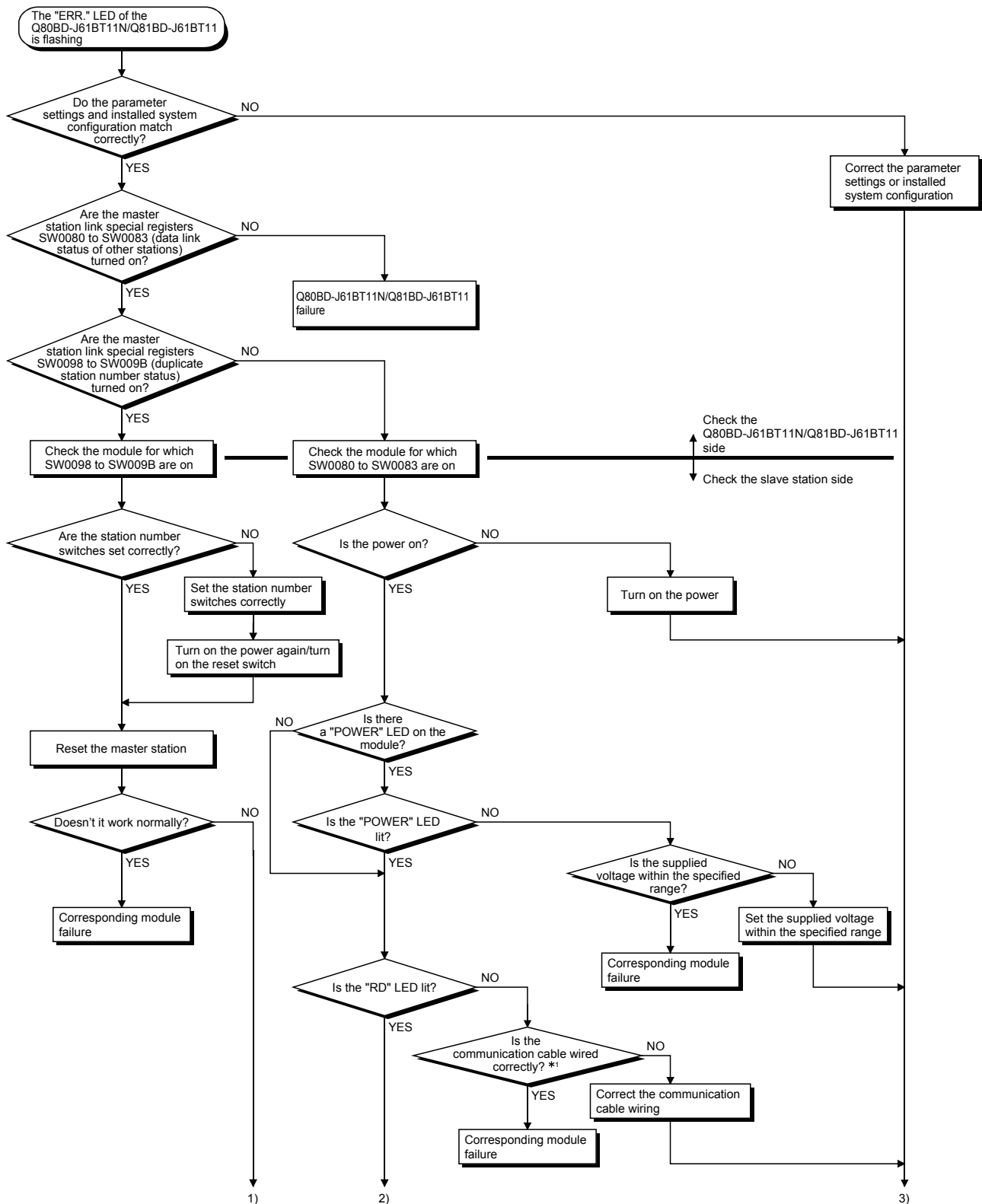
∗1: Check for short circuits, reversed connections, disconnections, terminal resistors, FG connections, overall distance, and distance between stations.

```
1)              2)                                                                                              3)
│               │                                                                                              │
│               ▼                                                                                              │
│        ╱─────────────╲         NO                                                                            │
│       ╱ Is the "L RUN" ╲────────────────┐                                                                    │
│       ╲  LED lit?      ╱                 │                                                                    │
│        ╲─────────────╱                   │                                                                    │
│            │ YES                          ▼                                                                   │
│            │                    ╱─────────────────╲      NO                                                  │
│            │                   ╱  Is the "SD" LED   ╲──────────────────┐                                     │
│            │                   ╲  lit (flashing)?   ╱                   │                                     │
│            ▼                    ╲─────────────────╱                     ▼                                     │
│      ╱─────────────╲     NO          │ YES             ╱─────────────────╲      NO                            │
│     ╱ Is the "SD"   ╲───────┐        │                ╱ Is the transmission ╲────────────┐                    │
│     ╲  LED lit?     ╱       │        │                ╲ rate set correctly?  ╱            │                    │
│      ╲─────────────╱        ▼        │                 ╲─────────────────╱                │                    │
│          │ YES    ┌──────────────┐   │                      │ YES                         ▼                    │
│          │        │ Corresponding│   │                      │                  ┌────────────────────────┐     │
│          │        │ module failure│  │                      │                  │ Set the correct        │     │
│          │        └──────────────┘   │                      │                  │ transmission rate      │     │
│          │                           │                      │                  └────────────────────────┘     │
│          └───────────────────────────│◄─────                │                           │                     │
│                                       │                      │                  ┌────────────────────────┐     │
│                                       │                      │                  │ Reset the              │     │
│                                       │                      │                  │ Q80BD-J61BT11N/Q81BD-J61BT11│ │
│                                       │                      │                  └────────────────────────┘     │
│                                       ▼                      ▼                           │                     │
│                          ╱─────────────────╲      NO   ╱─────────────────╲      NO       │                     │
│                         ╱ Are the station No.╲─────┐  ╱ Is the             ╲──────────┐   │                     │
│                         ╲ switches set correctly?  │ ╲ communication cable  ╱         │   │                     │
│                         ╲ (Isnt the station No.   ╱  ╲ wired correctly? *1 ╱          │   │                     │
│                          ╲ duplicated?)      ╱       ╲─────────────────╱              │   │                     │
│                           ╲───────────────╱               │ YES                       ▼   │                     │
│                               │ YES         │             │          ┌───────────────────────────┐ │           │
│                               │             │             │          │ Wire the communication    │ │           │
│                               │             │             │          │ cable correctly           │ │           │
│                               ▼             │             ▼          └───────────────────────────┘ │           │
│                    ┌────────────────────┐   │   ┌────────────────────┐        │                     │           │
│                    │ Corresponding      │   │   │ Corresponding      │        │                     │           │
│                    │ module failure     │   │   │ module failure     │        │                     │           │
│                    │ (Station No. switch)│  │   │(Transmission speed │        │                     │           │
│                    └────────────────────┘   │   │ switch)            │        │                     │           │
│                                             │   └────────────────────┘        │                     │           │
│                                             ▼                                  │                     │           │
│                                  ┌────────────────────┐                        │                     │           │
│                                  │ Set the correct    │                        │                     │           │
│                                  │ station No.        │                        │                     │           │
│                                  └────────────────────┘                        │                     │           │
│                                             │                                  │                     │           │
│                                  ┌────────────────────────┐                    │                     │           │
│                                  │ Reset the              │                    │                     │           │
│                                  │ Q80BD-J61BT11N/Q81BD-J61BT11.│              │                     │           │
│                                  └────────────────────────┘                    │                     │           │
│                                             │                                  │                     │           │
└─────────────────────────────────────────────┴──────────────────────────────────┴─────────────────────┴───────┘
                                             │
                                             ▼
                                   ╭───────────────────╮
                                   │     Complete       │
                                   ╰───────────────────╯
```
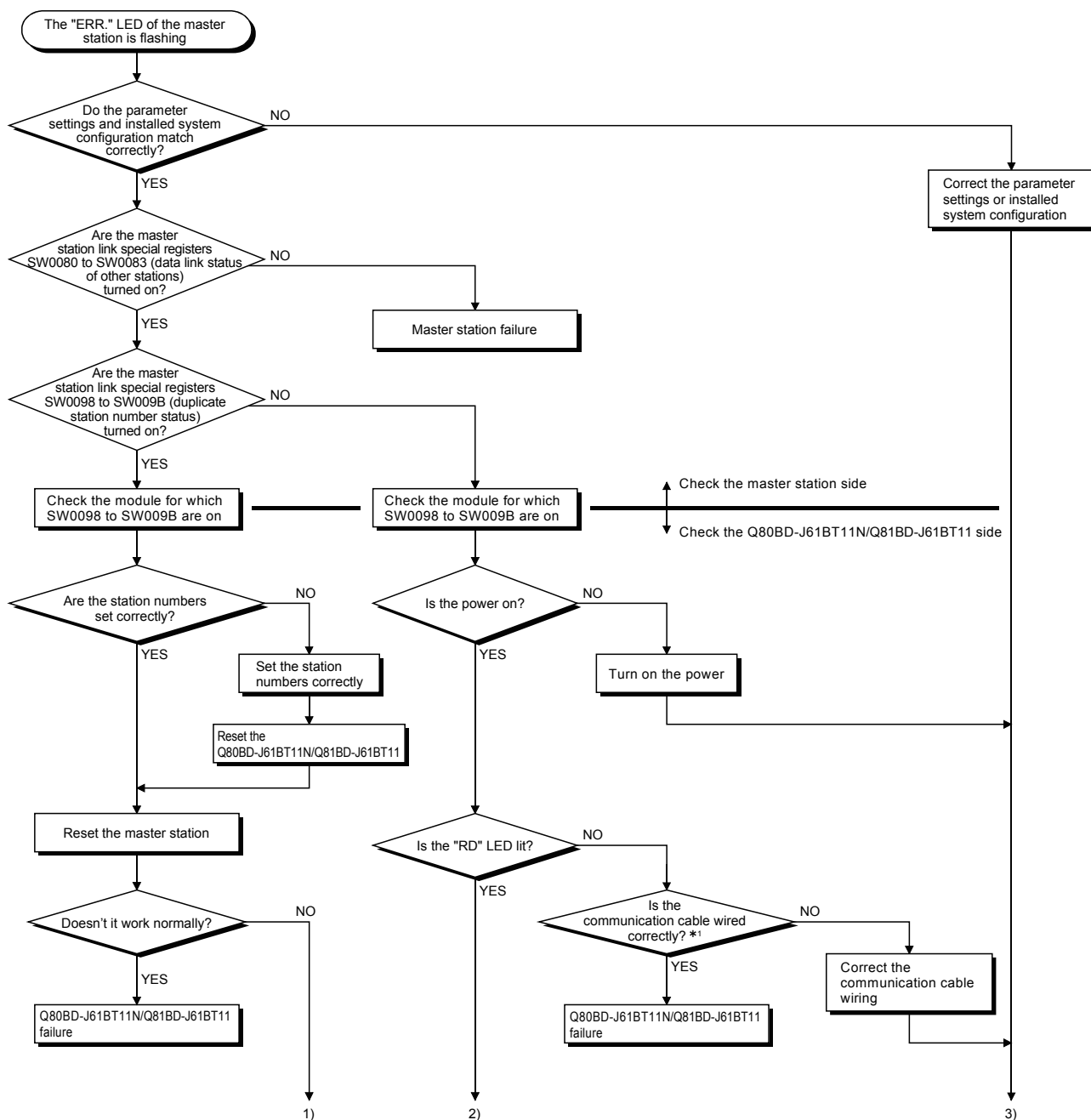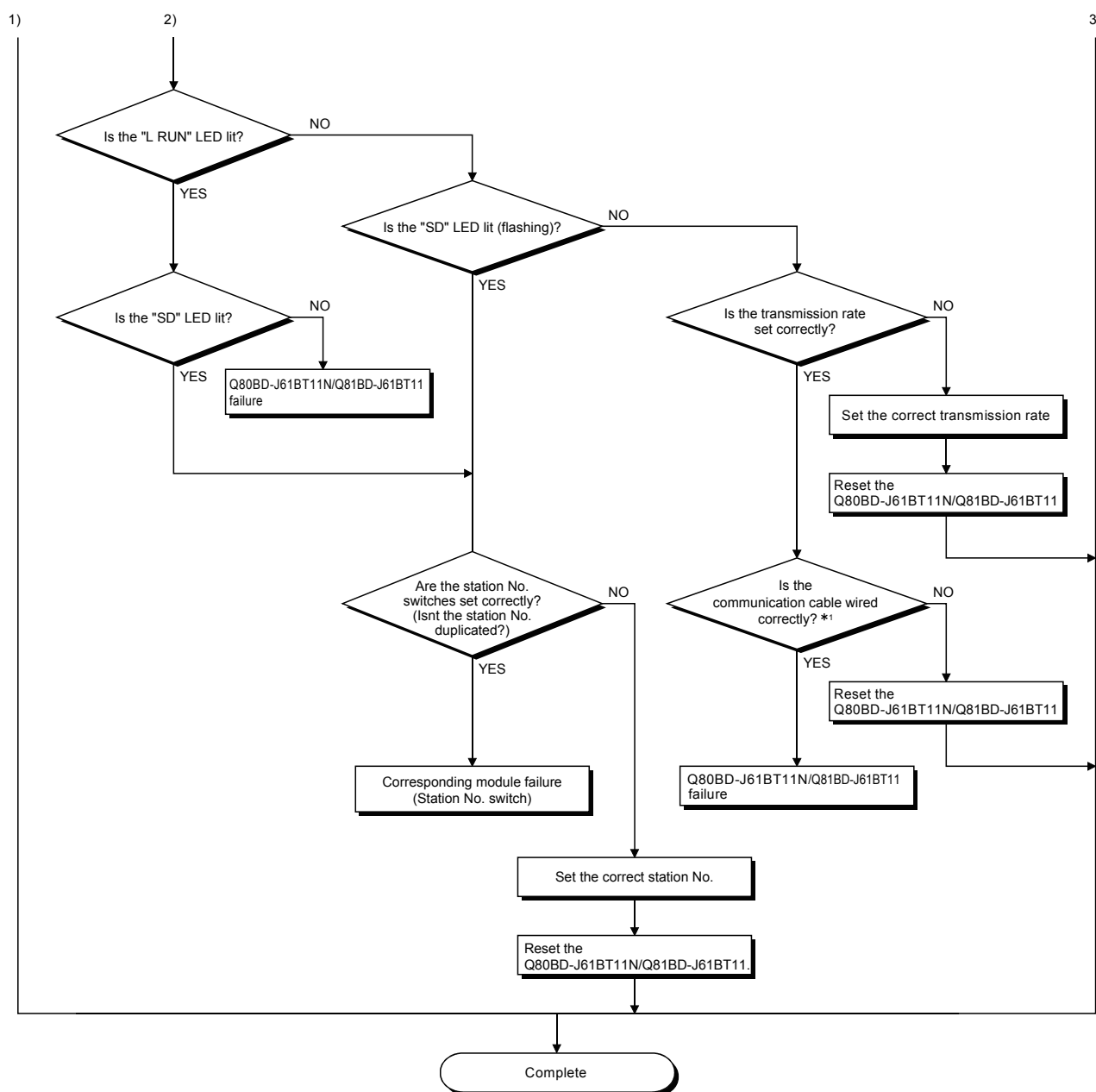
*1: Check for short circuits, reversed connections, disconnections, terminal resistors, FG connections, overall distance, and distance between stations.

(2) When the CC-Link Ver.2 board is used as a local board

✳1: Check for short circuits, reversed connections, disconnections, terminal resistors, FG connections, overall distance, and distance between stations.

1)

2)

3)

Is the "L RUN" LED lit? —NO→

YES

Is the "SD" LED lit? —NO→ Q80BD-J61BT11N/Q81BD-J61BT11 failure

YES

Is the "SD" LED lit (flashing)? —NO→

YES

Is the transmission rate set correctly? —NO→ Set the correct transmission rate → Reset the Q80BD-J61BT11N/Q81BD-J61BT11

YES

Are the station No. switches set correctly? (Isnt the station No. duplicated?) —NO→

YES

Corresponding module failure (Station No. switch)

Is the communication cable wired correctly? *1 —NO→ Reset the Q80BD-J61BT11N/Q81BD-J61BT11

YES

Q80BD-J61BT11N/Q81BD-J61BT11 failure

Set the correct station No.

Reset the Q80BD-J61BT11N/Q81BD-J61BT11.

Complete

*1: Check for short circuits, reversed connections, disconnections, terminal resistors, FG connections, overall distance, and distance between stations.

17.3.3 List of link special relays (SBs)

The data link status can be checked by the bit information (link special relays: SBs).
The values in parentheses in the number column indicate the buffer memory address.
When the standby master station is controlling the data link, the availability of the link's special relays is basically identical to that of the master station.
When the standby master station is operating as a local station, the availability of the link's special relays is identical to that of a local station.

Table 17.6 List of link special relays (SBs) (1/5)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SB0000 (5E0H, b0)	Data link restart	Restarts the data link that had been stopped by SB0002. OFF: Restart not instructed ON : Restart instructed	○	○	×
SB0001 (5E0H, b1)	Refresh instruction at standby master switching	Instructs to perform cyclic data refresh after the data link control is transferred to the standby master station. OFF: Not instructed ON : Instructed	○	×	×
SB0002 (5E0H, b2)	Data link stop	Stops the host data link. (SB0000 is used for restart.) However, when the master station executes this, the entire system will stop. OFF: No stop instruction ON : Stop instructed	○	○	×
SB0003 (5E0H, b3)	Refresh instruction when changing parameters by the dedicated instruction	Instructs to refresh cyclic data after changing parameters by the RLPASET instruction. OFF: Not instructed (stop refreshing) ON : Instructed (start/continue refreshing)	○	○	×
SB0004 (5E0H, b4)	Temporary error invalid request	Establishes the stations specified by SW0003 to SW0007 as temporary error invalid stations. The execution result of the request is stored to SW0049. OFF: Not requested ON : Requested	○	×	×
SB0005 (5E0H, b5)	Temporary error invalid canceling request	Cancels the temporary error invalid status of stations specified by SW0003 to SW0007. The execution result of the request is stored to SW004B. OFF: Not requested ON : Requested	○	×	×
SB0008 (5E0H, b8)	Line test request	Executes line tests for the stations specified by SW0008. The execution result of the request is stored to SW004D. OFF: Not requested ON : Requested	○	×	×
SB0009 (5E0H, b9)	Parameter information read request	Reads the parameter setting information for the actual system configuration. The execution result of the request is stored to SW004F. OFF: Normal ON : Abnormal	○	×	×
SB000C (5E0H, b12)	Forced master switching	Forcefully transfers the data link control from the standby master station that is controlling the data link to the standby master station in case the standby master station becomes faulty. OFF: Not requested ON : Requested	○ [2]	×	×

∗2: Can be used for the standby master station only.

Table 17.6 List of link special relays (SBs) (2/5)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SB000D (5E0H, b13)	Remote device station initialization procedure registration instruction	Starts the initial processing using the information registered during the initialization procedure registration. While SB000D is on, the refresh of the remote input/output and remote registers stops. OFF: Not instructed ON : Instructed	○ *1	×	×
SB0020 (5E2H, b0)	Board status	Indicates the buffer access status. OFF: Normal ON : Abnormal	○	○	○
SB0040 (5E4H, b0)	Data link restart acceptance	Indicates the data link restart instruction acknowledgment status. OFF: Not acknowledged ON : Startup instruction acknowledged	○	○	×
SB0041 (5E4H, b1)	Data link restart complete	Indicates the data link restart instruction acknowledgment completion status. OFF: Not complete ON : Startup complete	○	○	×
SB0042 (5E4H, b2)	Refresh instruction acknowledgment status at standby master switching	Indicates whether or not the refresh instruction at standby master switching have been acknowledged. OFF: Not executed ON : Instruction acknowledged	○	×	×
SB0043 (5E4H, b3)	Refresh instruction complete status at standby master switching	Indicates whether or not the refresh instruction at standby master switching is complete. OFF: Not executed ON : Switching complete	○	×	×
SB0044 (5E4H, b4)	Data link stop acceptance	Indicates the data link stop instruction acknowledgment status. OFF: Not acknowledged ON : Stop instruction acknowledged	○	○	×
SB0045 (5E4H, b5)	Data link stop complete	Indicates the data link stop instruction acknowledgment completion status. OFF: Not complete ON : Stop complete	○	○	×
SB0046 (5E4H, b6)	Forced master switching executable status	Indicates whether the forced master switching (SB000C) signal can be executed or not. OFF: Cannot be executed ON : Can be executed	○ *2	×	×
SB0048 (5E4H, b8)	Temporary error invalid acceptance status	Indicates the acknowledgement status temporary error invalid instruction. OFF: Not executed ON : Instruction acknowledged	○	×	×
SB0049 (5E4H, b9)	Temporary error invalid complete status	Indicates the acknowledgement completion status temporary error invalid instruction. OFF: Not executed ON : Temporary error invalid station established/Specified station number is invalid	○	×	×
SB004A (5E4H, b10)	Temporary error invalid canceling acknowledgment status	Indicates the acknowledgement status temporary error invalid cancel instruction. OFF: Not executed ON : Instruction acknowledged	○	×	×
SB004B (5E4H, b11)	Temporary error invalid canceling complete status	Indicates the acknowledgement completion status temporary error invalid cancel instruction. OFF: Not executed ON : Temporary error invalid station cancellation complete	○	×	×
SB004C (5E4H, b12)	Line test acceptance status	Indicates the line test request acknowledgment status. OFF: Not executed ON : Instruction acknowledged	○	×	×

*1: Can be used for the master station only.

*2: Can be used for the standby master station only.

Table 17.6 List of link special relays (SBs) (3/5)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SB004D (5E4H, b13)	Line test complete status	Indicates the line test completion status. OFF: Not executed ON : Test complete	○	×	×
SB004E (5E4H, b14)	Parameter information read acknowledgment status	Indicates the parameter information read request acknowledgment status. OFF: Not executed ON : Instruction acknowledged	○	×	×
SB004F (5E4H, b15)	Parameter information read completion status	Indicates the completion status of the parameter information read request. OFF: Not executed ON : Test complete	○	×	×
SB0050 (5E5H, b0)	Offline test status	Indicates the offline test execution status. OFF: Not executed ON : In progress	×	×	○
SB005A (5E5H, b10)	Master switching request acknowledgment	Indicates the acknowledgment status of the standby master station when it has received a master switching request from the line. OFF: Not acknowledged ON : Request acknowledged	○	×	×
SB005B (5E5H, b11)	Master switching request complete	Indicates whether or not the switching from the standby master station to master station is complete. OFF: Not complete ON : Complete	○	×	×
SB005C (5E5H, b12)	Forced master switching request acknowledgment	Indicates whether or not a forced master switching request has been acknowledged. OFF: Not acknowledged ON : Instruction acknowledged	○ *2	×	×
SB005D (5E5H, b13)	Forced master switching request complete	Indicates whether or not a forced master switching request is complete. OFF: Not complete ON : Complete	○ *2	×	×
SB005E (5E5H, b14)	Execution status of remote device station initialization procedure	Indicates the execution status of the initialization procedure. OFF: Not executed ON : Being executed	○ *1	×	×
SB005F (5E5H, b15)	Completion status of remote device station initialization procedure	Indicates the completion status of the initialization procedure execution. OFF: Not complete ON : Complete	○ *1	×	×
SB0060 (5E6H, b0)	Host mode	Indicates the mode setting status of the host. OFF: Online ON : Other than online	○	○	○
SB0061 (5E6H, b1)	Host type	Indicates the station type of the host. OFF: Master station (station number 0) ON : Local station (station numbers 1 to 64)	○	○	×
SB0062 (5E6H, b2)	Host standby master station setting status	Indicates whether or not the standby master station setting exists for the host. OFF: No setting ON : Setting exists	○	○	○
SB0065 (5E6H, b5)	Input data status of host data link faulty station	Indicates the input status setting from a data link faulty station of the host. OFF: Clear ON : Hold	○	○	×

*1: Can be used for the master station only.

*2: Can be used for the standby master station only.

Table 17.6 List of link special relays (SBs) (4/5)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SB0066 (5E6H, b6)	Number of host occupied stations	Indicates the setting status of host occupied stations. 	Number of occupied station	SB0066	SB0067
---	---	---
1 station	OFF	OFF
2 stations	OFF	ON
3 stations	ON	ON
4 stations	ON	OFF		×	○	×
SB0067 (5E6H, b7)					
SB006A (5E6H, b10)	Switch setting status	Indicates the setting status of the host. OFF: Normal ON : Setting error exists (the error code is stored in SW006A)	○	○	○
SB006D (5E6H, b13)	Parameter setting status	Indicates the parameter setting status. OFF: Normal ON : Setting error exists (the error code is stored in SW0068)	○	○	×
SB006E (5E6H, b14)	Host station operation status	Indicates the host data link operation status. OFF: Being executed ON : Not executed	○	○	×
SB0070 (5E7H, b0)	Master station information	Indicates the data link status. OFF: Data link control by the master station ON : Data link control by the standby master station	○	○	×
SB0071 (5E7H, b1)	Standby master station information	Indicates whether or not a standby master station is present. OFF: Not present ON : Present	○	○	×
SB0072 (5E7H, b2)	Scan mode setting information	Indicates the scan mode setting information. OFF: Asynchronous mode ON : Synchronous mode	○	×	×
SB0073 (5E7H, b3)	Operation specification when CPU is down status	Indicates the operation specification status using a parameter when the CPU is down. OFF: Stop ON : Continue	○	×	×
SB0074 (5E7H, b4)	Reserved station specified status	Indicates the reserved station specification status using a parameter. OFF: No specification ON : Specification exists (information is stored in SW0074 to SW0077)	○	○	×
SB0075 (5E7H, b5)	Error invalid station specified status	Indicates the error invalid station specification status using a parameter. OFF: No specification ON : Specification exists (information is stored in SW0078 to SW007B)	○	○	×
SB0076 (5E7H, b6)	Temporary error invalid station setting information	Indicates whether there is a temporary error invalid station setting. OFF: No setting ON : Setting exists (information is stored in SW007C to SW007F)	○	○	×
SB0077 (5E7H, b7)	Parameter receive status	Indicates the parameter receive status from the master station. OFF: Reception complete ON : Reception not complete	×	○	×
SB0079 (5E7H, b9)	Master station return specification information	Indicates whether the "Type" setting of the host operates is set to "Master station" or "Master station (Duplex function)." OFF: Master station ON : Master station (Duplex function)	○	×	×
SB007B (5E7H, b11)	Host master/standby master operation status	Indicates whether the host operates as the master or standby master station. OFF: Operates as the master station (controlling data link) ON : Operates as the standby master station (standby)	○	○	×

Table 17.6 List of link special relays (SBs) (5/5)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SB007C (5E7H, b12)	Slave station refresh/forced clear setting status in case of programmable controller CPU STOP	Indicates the parameter-set slave station refresh/ forced clear setting status in case of programmable controller CPU STOP. OFF: Refresh ON : Clears compulsorily	○	×	×
SB0080 (5E8H, b0)	Other station data link status	Indicates the communication status between remote/local/intelligent device/standby master stations. OFF: All stations normal ON : Faulty station exists (information is stored in SW0080 to SW0083)	○	○	×
SB0081 (5E8H, b1)	Other station watchdog timer error status	Indicates the occurrence of a watchdog timer error in other stations. (SW0084 to SW0087) OFF: No error ON : Error occurrence	○	○	×
SB0082 (5E8H, b2)	Other station fuse blown status	Indicates the fuse blown occurrence status at other stations. (SW0088 to SW008B) OFF: No error ON : Error occurrence	○	○	×
SB0083 (5E8H, b3)	Other station switch change status	Detects changes in setting switches of other stations during data linking. (SW008C to SW008F) OFF: No change ON : Change detected	○	○	×
SB0090 (5E9H, b0)	Host line status	Indicates the line status of the host. OFF: Normal ON : Abnormal (line disconnection)	×	○	×
SB0094 (5E9H, b4)	Transient transmission status	Indicates whether there is a transient transmission error. (SW0094 to SW0097) OFF: No error ON : Error occurrence	○	○	×
SB0095 (5E9H, b5)	Master station transient transmission status	Indicates the transient transmission status of the master station. OFF: Normal ON : Abnormal	×	○	×
SB00B4 (5EBH, b4)	Standby master station test result	Stores the test result of Line test 1/Line test 2. OFF: Normal ON : Abnormal	○	×	○

17.3.4 List of link special registers (SWs)
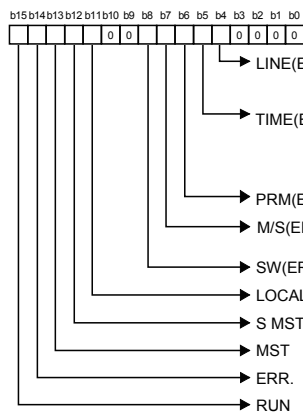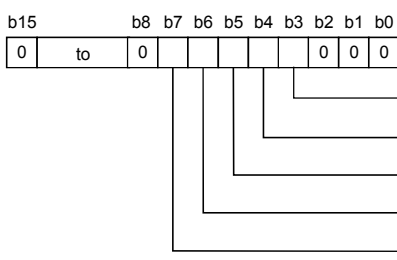
The data link status can be checked by the word information (link special registers: SWs).
When the standby master station is controlling the data link, availability is basically identical to that of the master station.
When the standby master station is operating as a local station, availability is identical to that of a local station.

Table 17.7 List of link special registers (SWs) (1/7)

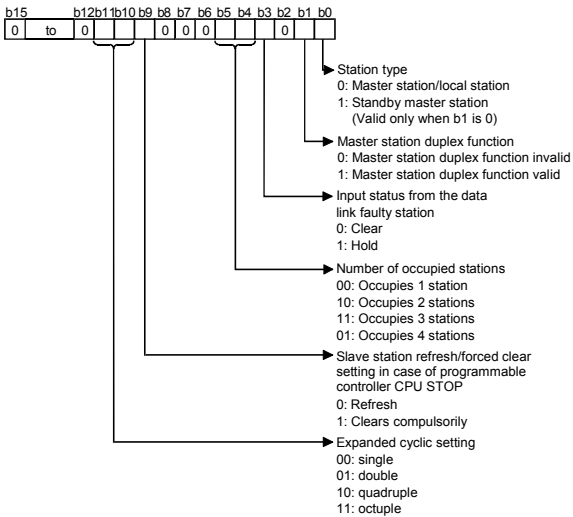| Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SW0003 (603H)	Multiple temporary error invalid station specification	Select whether multiple temporary error invalid stations are specified. 00 : Specifies multiple stations indicated by SW0004 to SW0007. 01 to 64: Specifies a single station from 1 to 64. (The specified number indicates the station number of a temporary error invalid station.)	○	×	×
SW0004 (604H) SW0005 (605H) SW0006 (606H) SW0007 (607H)	Temporary error invalid station specification [1]	Specifies a temporary error invalid station. 0: Not specified as a temporary error invalid station 1: Specified as a temporary error invalid station b15 b14 b13 b12 to b3 b2 b1 b0 SW0004: 16 15 14 13 to 4 3 2 1 SW0005: 32 31 30 29 to 20 19 18 17 SW0006: 48 47 46 45 to 36 35 34 33 SW0007: 64 63 62 61 to 52 51 50 49 Numbers 1 to 64 in the above table indicate the station numbers.	○	×	×
SW0008 (608H)	Line test station setting	Sets the station for which line tests are executed. 0 : Entire system (executed for all stations) 01 to 64 : Specified station only Default value : 0	○	×	×
SW0009 (609H)	Monitoring time setting	Sets the monitoring time when a dedicated instruction is used. Default value : 10 (seconds) Setting range : 0 to 360 (seconds) The monitoring time of 360 seconds will be used if a value outside of the above setting range is specified.	○	○	×
SW000A (60AH)	CPU monitoring time setting	Sets the CPU response monitoring time when the CPU is accessed with a dedicated instruction. Default value : 90 (seconds) Setting range : 0 to 3600 (seconds) The monitoring time of 3600 seconds will be used if a value outside of the above setting range is specified.	○	○	×
SW0020 (620H)	Module status	Indicates the module status. 0 : Normal Other than 0 : Stores the error code (refer to Section 17.3.5).	○	○	○
SW0041 (641H)	Data link restart result	Stores the execution result of the data link restart instruction with SB0000. 0 : Normal Other than 0 : Stores the error code (refer to Section 17.3.5).	○	○	×
SW0043 (643H)	Refresh instruction at standby master switching result	Indicates the execution result of refresh instruction at standby master switching. 0 : Normal Other than 0 : Stores the error code (refer to Section 17.3.5).	○	×	×

[1]: Only the bit for the first station number is turned on.

Table 17.7 List of link special registers (SWs) (2/7)

Number	Name	Description	Availability (○: Available, ×: Not available) Online Master station	Local station	Offline
SW0045 (645H)	Data link stop result	Stores the execution result of the data-link stop instruction with SB0002. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○	○	×
SW0049 (649H)	Temporary error invalid station specification result	Indicates the execution result of temporary error invalid station specification with SB0004. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○	×	×
SW004B (64BH)	Temporary error invalid station specification cancel result	Indicates the execution result of the temporary error invalid station specification cancellation with SB0005. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○	×	×
SW004D (64DH)	Line test result	Indicates the execution result of the line test with SB0008. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○	×	×
SW004F (64FH)	Parameter setting test result	Indicates the execution result of the parameter setting test with SB0009. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○	×	×
SW0052 (652H)	Automatic CC-Link startup execution result	Stores the system configuration check result when a new station is added to a system using an automatic CC-Link startup. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○	×	×
SW0058 (658H)	Detailed LED display status	Stores the details of the LED display status. 0: OFF 1: ON LINE(ERROR): Cable is disconnected or the transmission path is affected by noise. TIME(ERROR): Responses cannot be received from any station due to the cable being disconnected or the transmission path being affected by noise. PRM(ERROR): Invalid parameter value M/S(ERROR): Duplicate station on the same line SW(ERROR): Setting Error LOCAL: Operating as a local station S MST: Operating as the standby master station MST: Operating as the master station ERR.: Error occurrence RUN: The module is operating normally.	○	○	○
SW0059 (659H)	Transmission rate setting	Stores the contents of the transmission rate setting. 0: Cancel 1: Set 10 Mbps 5 Mbps 2.5 Mbps 625 kbps 156 kbps	○	○	○
SW005D (65DH)	Forced master switching instruction result	Stores the execution result of the forced master switching instruction with SB000C. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○ *3	×	×

*3: Can be used for the standby master station only.

Table 17.7 List of link special registers (SWs) (3/7)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SW005F (65F$_H$)	Remote device station initialization procedure registration instruction result	Stores the execution result of the initialization procedure registration instruction with SB000B. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○ *[2]	×	×
SW0060 (660$_H$)	Mode setting status	Stores the mode setting status. 0: Online (with automatic return) 2: Offline 3: Line test 1 4: Line test 2 6: Hardware test	○	○	○
SW0061 (661$_H$)	Host station number	Stores the station number of the host that is currently in operation. 0 : Master station 1 to 64 : Local station	○	○	○
SW0062 (662$_H$)	Module operating status	Stores the operation setting status of the CC-Link Ver.2 board. 	○	○	○
SW0064 (664$_H$)	No. of retries information	Indicates the retry count setting information when there is an error response. 1 to 7 (times)	○	×	×
SW0065 (665$_H$)	No. of automatic return stations	Indicates the setting information for the number of automatic return stations during one link scan. 1 to 10 (stations)	○	×	×
SW0066 (666$_H$)	Delay timer information	Indicates the setting information for the scan interval delay time. 0 to 100 (50 μ s)	○	×	×
SW0067 (667$_H$)	Parameter information	Stores the parameter information area to be used. 0$_H$: CPU built-in parameters 3$_H$: Dedicated instruction (parameter setting with the RLPASET instruction and data link startup.) D$_H$: Default parameters (automatically starts CC-Link)	○	×	○
SW0068 (668$_H$)	Host parameter status	Stores the parameter setting status. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○	○	×

*2: Can be used for the master station only.

Table 17.7 List of link special registers (SWs) (4/7)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SW0069 (669H)	Loading status *4	Stores the duplicate station number status and parameter matching of each station. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5). Details are stored in SW0098 to 9B and SW009C to 9F.	○	×	×
SW006A (66AH)	Switch setting status	Stores the switch setting status. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	○	○	○
SW006D (66DH)	Max. link scan time	Stores the maximum value of the link scan time (in 1 ms units).	○	○	×
SW006E (66EH)	Current link scan time	Stores the current value of the link scan time (in 1 ms units).	○	○	×
SW006F (66FH)	Min. link scan time	Stores the minimum value of the link scan time (in 1 ms units).	○	○	×
SW0070 (670H)	Total number of stations	Stores the final station number set in the parameter. 1 to 64 (stations)	○	×	×
SW0071 (671H)	Max. communication station number	Stores the maximum station number that is performing data link. 1 to 64 (stations)	○	×	×
SW0072 (672H)	Number of connected modules	Stores the number of modules that are performing data link.	○	×	×
SW0073 (673H)	Standby master station number	Stores the station number of the standby master station. 1 to 64 (stations)	○	○	×
SW0074 (674H) SW0075 (675H) SW0076 (676H) SW0077 (677H)	Reserved station specified status *1	Stores the reserved station setting status. 0: Not reserved station 1: Reserved station |	b15	b14	b13	b12	to	b3	b2	b1	b0 | SW0074	16	15	14	13	to	4	3	2	1 | SW0075	32	31	30	29	to	20	19	18	17 | SW0076	48	47	46	45	to	36	35	34	33 | SW0077	64	63	62	61	to	52	51	50	49 | Numbers 1 to 64 in the above table indicate the station numbers.	○	○	×
SW0078 (678H) SW0079 (679H) SW007A (67AH) SW007B (67BH)	Error invalid station specified status *1	Stores the error invalid station setting status. 0: Other than error invalid station 1: Error invalid station |	b15	b14	b13	b12	to	b3	b2	b1	b0 | SW0078	16	15	14	13	to	4	3	2	1 | SW0079	32	31	30	29	to	20	19	18	17 | SW007A	48	47	46	45	to	36	35	34	33 | SW007B	64	63	62	61	to	52	51	50	49 | Numbers 1 to 64 in the above table indicate the station numbers.	○	○	×

∗1: Only the bit for the first station number is turned on.

∗4: This register checks and stores the status only at link startup.

Table 17.7 List of link special registers (SWs) (5/7)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SW007C (67C$_H$) SW007D (67D$_H$) SW007E (67E$_H$) SW007F (67F$_H$)	Temporary error invalid status *5	Indicates the temporary error invalid status. 0: Normal status 1: Temporary error invalid status. Table: b15-b0, SW007C: 16 15 14 13 to 4 3 2 1, SW007D: 32 31 30 29 to 20 19 18 17, SW007E: 48 47 46 45 to 36 35 34 33, SW007F: 64 63 62 61 to 52 51 50 49. Numbers 1 to 64 in the above table indicate the station numbers.	○	○	×
SW0080 (680$_H$) SW0081 (681$_H$) SW0082 (682$_H$) SW0083 (683$_H$)	Other station data link status *5	Stores the data link status of each station. 0: Normal 1: Data link error occurrence. Table: b15-b0, SW0080: 16 15 14 13 to 4 3 2 1, SW0081: 32 31 30 29 to 20 19 18 17, SW0082: 48 47 46 45 to 36 35 34 33, SW0083: 64 63 62 61 to 52 51 50 49. Numbers 1 to 64 in the above table indicate the station numbers.	○	○	×
SW0084 (684$_H$) SW0085 (685$_H$) SW0086 (686$_H$) SW0087 (687$_H$)	Other station watchdog timer error occurrence status *1	Indicates the watchdog timer error status on each station. 0: No watchdog timer error 1: Watchdog timer error occurrence. Table: b15-b0, SW0084: 16 15 14 13 to 4 3 2 1, SW0085: 32 31 30 29 to 20 19 18 17, SW0086: 48 47 46 45 to 36 35 34 33, SW0087: 64 63 62 61 to 52 51 50 49. Numbers 1 to 64 in the above table indicate the station numbers.	○	○	×
SW0088 (688$_H$) SW0089 (689$_H$) SW008A (68A$_H$) SW008B (68B$_H$)	Other station fuse blown status *5	Stores the fuse blown occurrence status of each station. 0: Normal 1: Abnormal. Table: b15-b0, SW0088: 16 15 14 13 to 4 3 2 1, SW0089: 32 31 30 29 to 20 19 18 17, SW008A: 48 47 46 45 to 36 35 34 33, SW008B: 64 63 62 61 to 52 51 50 49. Numbers 1 to 64 in the above table indicate the station numbers.	○	×	×
SW008C (68C$_H$) SW008D (68D$_H$) SW008E (68E$_H$) SW008F (68F$_H$)	Other station switch change status *1	Indicates the switch change status of other stations performing data link. 0: No change 1: Change occurred. Table: b15-b0, SW008C: 16 15 14 13 to 4 3 2 1, SW008D: 32 31 30 29 to 20 19 18 17, SW008E: 48 47 46 45 to 36 35 34 33, SW008F: 64 63 62 61 to 52 51 50 49. Numbers 1 to 64 in the above table indicate the station numbers.	○	○	×

*1: Only the bit for the first station number is turned on.

*5: Bits for the number of occupied stations are turned on.

Table 17.7 List of link special registers (SWs) (6/7)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	
SW0090 (690H)	Line status	Stores the line status. 0: Normal 1: Data link cannot be performed (disconnected)	×	○	×
SW0094 (694H) SW0095 (695H) SW0096 (696H) SW0097 (697H)	Transient transmission status *1	Indicates the occurrence status of a transient transmission error. 0: No transient transmission error 1: Transient transmission error occurrence (bit table: b15 b14 b13 b12 to b3 b2 b1 b0) SW0094: 16 15 14 13 to 4 3 2 1 SW0095: 32 31 30 29 to 20 19 18 17 SW0096: 48 47 46 45 to 36 35 34 33 SW0097: 64 63 62 61 to 52 51 50 49 Numbers 1 to 64 in the above table indicate the station numbers.	○	○	×
SW0098 (698H) SW0099 (699H) SW009A (69AH) SW009B (69BH)	Station number overlap status *6	Stores the overlap status when the first station number of each module is not overlapped. 0: Normal 1: Overlap station number (first station number only) (bit table: b15 b14 b13 b12 to b3 b2 b1 b0) SW0098: 16 15 14 13 to 4 3 2 1 SW0099: 32 31 30 29 to 20 19 18 17 SW009A: 48 47 46 45 to 36 35 34 33 SW009B: 64 63 62 61 to 52 51 50 49 Numbers 1 to 64 in the above table indicate the station numbers.	○	×	×
SW009C (69CH) SW009D (69DH) SW009E (69EH) SW009F (69FH)	Loading/parameter consistency status *6	Stores the consistency status between the loaded station and the parameter settings. A matching error occurs in any of the following cases. 1) Station type mismatch * 2) Number of occupied stations mismatch 3) Expanded cyclic setting mismatch * 4) CC-Link compatible version mismatch * A matching error will not occur when installation ≤ parameter. (For example, a matching error will not occur when a remote device station is installed and the parameter setting is an intelligent device station.) 0: Normal 1: Matching error Example of matching error 	Installation	Parameter
Remote device station	Remote I/O station
Intelligent device station	Remote I/O station / Remote device station	 (bit table: b15 b14 b13 b12 to b3 b2 b1 b0) SW009C: 16 15 14 13 to 4 3 2 1 SW009D: 32 31 30 29 to 20 19 18 17 SW009E: 48 47 46 45 to 36 35 34 33 SW009F: 64 63 62 61 to 52 51 50 49 Numbers 1 to 64 in the above table indicate the station numbers.	○	×	×

*1: Only the bit for the first station number is turned on.

*6: Only the bit for the first station number is turned on. In addition, these registers check and store the status at link startup.

Table 17.7 List of link special registers (SWs) (7/7)

Number	Name	Description	Availability (○: Available, ×: Not available)		
			Online		Offline
			Master station	Local station	

SW00B4 (6B4H) SW00B5 (6B5H) SW00B6 (6B6H) SW00B7 (6B7H)	Line test 1 result *5	Stores the line test 1 result. 0: Normal 1: Abnormal
		
		`       b15 b14 b13 b12 to b3 b2 b1 b0`
		`SW00B4  16  15  14  13  to  4  3  2  1`
		`SW00B5  32  31  30  29  to 20 19 18 17`
		`SW00B6  48  47  46  45  to 36 35 34 33`
		`SW00B7  64  63  62  61  to 52 51 50 49`
		Numbers 1 to 64 in the above table indicate the station numbers.
			○	×	○

SW00B8 (6B8H)	Line test result	Stores the line test 1/line test 2 result. 0 : Normal Other than 0: Stores the error code (refer to Section 17.3.5).	×	×	○

SW0140 (740H) SW0141 (741H) SW0142 (742H) SW0143 (743H)	Compatible CC-Link ver. information *6	Indicates the slave stations compatible with CC-Link Ver.2. 0: Ver.1 compatible slave station 1: Ver.2 compatible slave station
		
		`       b15 b14 b13 b12 to b3 b2 b1 b0`
		`SW0140  16  15  14  13  to  4  3  2  1`
		`SW0141  32  31  30  29  to 20 19 18 17`
		`SW0142  48  47  46  45  to 36 35 34 33`
		`SW0143  64  63  62  61  to 52 51 50 49`
		Numbers 1 to 64 in the above table indicate the station numbers.
			○	×	×

SW0144 (744H) SW0145 (745H) SW0146 (746H) SW0147 (747H)	CC-Link ver. installation/parameter matching status *6	Stores the CC-Link version matching status of the parameters and slave stations. 0: Normal 1: Matching error Example of matching error 	Installation	Parameter
---	---
Ver.2compatible remote device station	Ver.1compatible remote device station

Ver.1compatible remote device station	Ver.2compatible remote device station	
		
		`       b15 b14 b13 b12 to b3 b2 b1 b0`
		`SW0144  16  15  14  13  to  4  3  2  1`
		`SW0145  32  31  30  29  to 20 19 18 17`
		`SW0146  48  47  46  45  to 36 35 34 33`
		`SW0147  64  63  62  61  to 52 51 50 49`
		Numbers 1 to 64 in the above table indicate the station numbers.
			○	×	×

SW0148 (748H)	Parameter mode	Indicates in which mode the system is operating. 0: Remote net ver.1 mode 1: Remote net additional mode 2: Remote net ver.2 mode	○	○	×
SW0149 (749H)	Host parameter mode	Indicates in which mode the host is operating. 0: Remote net ver.1 mode 1: Remote net additional mode 2: Remote net ver.2 mode	○	○	○

＊5: Bits for the number of occupied stations are turned on.

＊6: Only the bit for the first station number is turned on. In addition, these registers check and store the status at link startup.

The update timing of the data in a link special register (SW) differs depending on the link register number.

Table 17.8 lists the update timings of the link special registers.

Table 17.8 Update timings of the link special registers

Link special register	Data update timing	Link special register	Data update timing
SW0041	Updated individually regardless of the SB.	SW0071	Updated individually regardless of the SB. (Updated after each station reaches a stable condition.)
SW0045		SW0072	
SW0060	When the SB0060 changes.	SW0074 to SW0077	When the SB0074 changes.
SW0061	When the SB0061 changes.	SW0078 to SW007B	When the SB0075 changes.
SW0062	Updated individually regardless of the SB.	SW0080 to SW0083	When the SB0080 changes.
SW0067		SW0088 to SW008B	Updated individually regardless of the SB.
SW0068		SW0090	When the SB0090 changes.
SW0069		SW0098 to SW009B	Updated individually regardless of the SB.
SW006A		SW009C to SW009F	
SW006D		SW00B4 to SW00B7	
SW006E		SW00B8	
SW006F		SW00B9	
SW0070		—	—

17.3.5 Error codes stored in the link special registers

Table 17.9 lists the error codes that are stored in the link special registers (SWs).

Table 17.9 Error code list

Error code (hexadecimal)	Error description	Cause of error (details)	Corrective action	Detectability Master station	Detectability Local station
B110	Cannot receive messages.	A line error has occurred.	Check the line.	○	○
B111	Message data receiving order error	A line error has occurred.	Check the line.	○	○
B112	Message data length error	A line error has occurred.	Check the line.	○	○
B113	Message data ID error	A line error has occurred, or an instantaneous power failure has occurred in the send station.	Check the line, power supply for the send station or power supply module.	○	○
B114	Link error	A line error has occurred.	Check the line.	○	○
B115	Link error	A line error has occurred.	Check the line.	○	○
B116	Abnormal head bit	A line error has occurred.	Check the line.	○	○
B201	Corresponding station error during sending	A data link error occurred in the corresponding station during transient transmission.	Check the communication status of other stations, whether or not a temporary error invalid station is designated, or if the own station is stopped.	○	○
B205	Transient target station error	A transient request was issued to other than the intelligent device station.	Check the target station.	○	○
B301	Processing request error during link stop	A line test request was issued while the link was stopped.	Perform a line test during link startup.	○	○
B302	Designated station number setting error	The designated station number exceeded the maximum communication station number during temporary error invalid request/temporary error invalid cancel request.	Designate a station number that is no greater than the maximum communication station number.	○	×
B303	Designated station number not set error	The designated station numbers were not set during temporary error invalid request/temporary error invalid cancel request.	Set station numbers to designate. (SW0003, SW0004 to SW0007)	○	×
B304	Line test error station detected	An error was detected in a remote station or an intelligent device station while executing a line test.	Check whether the remote station and the intelligent device station are started and the cable is connected properly.	○	×
B306	Designated station number setting error	A station number other than the head station was designated by a temporary error invalid request/temporary error invalid cancel request.	Designate the head station by a temporary error invalid request/temporary error invalid cancel request.	○	○
B307	All stations data link error	All stations were in data link error status when either of the following requests was made: • SB0000 (data link restart) • SB0002 (data link stop)	Request again after the data link becomes normal.	○	○
B308	Station number setting error (installation status)	The station number of the slave station is outside of the range between 1 and 64.	Set the station number of the slave station within the range between 1 and 64.	○	×
B309	Duplicate station number error	A duplicate station number was specified for the connected board/ module (including the number of occupied stations). However, this excludes the duplicate head station numbers.	Check the board/module station number.	○	×

Error code (hexadecimal)	Error description	Cause of error (details)	Corrective action	Detectability Master station	Detectability Local station
B30A	Installation/parameter mismatching error	The station types of the module are different from the parameter settings. Example) | Connected module	Parameter setting	 | Remote device	Remote I/O	 | Intelligent device	Remote I/O	 |	Remote device		Set the correct parameters.	○	×
B30B	Installation/parameter mismatching error	The contents of the installation status and network parameters do not match.	Match the contents of the installation status and network parameters.	○	×
B30C	Standby master station designation error	Master station switching was directed to a station other than the standby master station.	Designate the station number of the standby master station.	○	○
B30D	Temporary error invalid station designation error	A temporary error invalid station was designated before the link was started.	Designate a temporary error invalid station during data link.	○	×
B384	Station number setting error (parameter)	The station number (including the number of occupied stations) was set to a value "other than 1_H to 40_H with a station information parameter (addresses 20_H to $5F_H$).	Set the station number within the range from "1_H to 40_H."	○	×
B385	Total number of stations error (parameter)	The total number of occupied stations set with a station information parameter (addresses 20_H to $5F_H$) exceed "64."	Set a value of "64 or less."	○	×
B386	Number of occupied stations setting error (parameter)	The number of all occupied stations was set to "0" with a station information parameter (addresses 20_H to $5F_H$).	Set the occupied station number between "1 and 4."	○	×
B387	Use prohibited area write error	A write operation was performed to a use prohibited area (not used) in the buffer memory.	Do not write to any of the use prohibited areas (not used) in the buffer memory.	○	○
B388	Station type setting error	The station type was set to a value "other than 0 to 2" with a station information parameter (addresses 20_H to $5F_H$).	Set the parameter within the range from "0 to 2."	○	×
B389	Use prohibited area write error	A write operation was performed to a use prohibited area (not used) in the buffer memory.	Do not write to any of the use prohibited areas (not used) in the buffer memory.	○	○
B38B	Remote device station setting error (parameter)	The number of remote device stations was set to "43 stations or more" with a station information parameter (addresses 20_H to $5F_H$).	Set the number of remote device stations to "42 stations or less."	○	×
B38C	Intelligent device station setting error (parameter)	The number of intelligent device stations (including local stations) was set to "27 stations or more" with a station information parameter (addresses 20_H to $5F_H$).	Set the number of intelligent device stations to "26 stations or less."	○	×
B38D	Invalid station designation error (parameter)	The invalid station designation parameter (addresses 14_H to 17_H) was set to a value "other than board/module's head station number" or "station number not specified in the parameter." <Example of other than head station number> A bit other than for station number 5 was on for a module occupying 4 stations (station numbers 5 to 8).	Set the head station number of the target station. Do not designate any of the stations not specified with a parameter.	○	×

Error code (hexadecimal)	Error description	Cause of error (details)	Corrective action	Detectability	
				Master station	Local station
B38E	Communication buffer assignment error	The total size of the communication buffer set with a station information parameter (addresses 20$_H$ to 5F$_H$) exceeded 4 k words.	Set the total size of the communication buffer to 4 k words or less.	○	○
B38F	Automatic update buffer assignment error	The total size of the automatic update buffer set with a station information parameter (addresses 20$_H$ to 5F$_H$) exceeded 4 k words.	Set the total size of the automatic update buffer to 4 k words or less.	○	○
B390	Standby master station designation error (parameter)	The standby master station designation parameter (address 4$_H$) was set to a value "other than 1 to 64."	Set the standby master station to a value within the range from "1 to 64."	○	○
B391	Number of retries setting error (parameter)	The number of retries setting parameter (address 2$_H$) was set to a value "other than 1 to 7."	Set a value within the range from "1 to 7."	○	×
B394	Number of auto return stations setting error (parameter)	The number of auto return stations setting parameter (address 3$_H$) was set to a value "other than 1 to 10."	Set a value within the range from "1 to 10."	○	×
B396	Station number duplicate error (parameter)	A duplicate station number was set with a station information parameter (addresses 20$_H$ to 5F$_H$).	Set the parameter so that station numbers are not duplicated.	○	×
B397	Station data setting error (parameter)	The station information parameter (addresses 20$_H$ to 5F$_H$) setting does not satisfy the following condition: $(16 \times 4) + (54 \times B) + (88 \times C) \leq 2304$ A: Number of remote I/O stations B: Number of remote device stations C: Number of intelligent device stations (including local stations)	Set the parameter so that it satisfies the condition shown at the left.	○	×
B398	Number of occupied stations setting error (parameter)	The number of occupied stations in a station information parameter (addresses 20$_H$ to 5F$_H$) was set to a value "other than 1 to 4."	Set a value within the range from "1 to 4."	○	×
B399	Number of connected modules setting error (parameter)	The number of connected modules parameter (address 1$_H$) was set to a value "other than 1 to 64."	Set a value within the range from "1 to 64."	○	×
B39A	Standby master station designation error (installation status)	The condition setting switch for the station number not specified with a parameter is designated for the standby master station.	Check the parameter or condition setting switch.	×	○
B39B	Reserved station designation error (parameter)	All stations were set as reserved stations with a parameter.	Check the parameter's reserved station setting.	○	×
B39C	Standby master station setting error	A station number specified as a standby master station is set to a station other than an intelligent device station.	Specify the standby master station as an intelligent device station.	○	×
B401	Parameter change error	A parameter change was executed during a transient request.	Change the parameter after all transient requests are completed or before any are requested.	○	○
B404	Response error	A response from the requesting station was not returned within the monitor time period.	Set a longer monitor time setting value. If an error persists, check the requesting station and cables.	○	○
B405	Transient target station error	A transient request was issued to a remote I/O station or remote device station.	Set the target station to a local station or intelligent device station.	○	○
B406	RY simultaneous on error	A request was issued without turning RY on/RY off before the response is completed.	Always turn RY off and then issue a request after the response is completed.	○	○

Error code (hexadecimal)	Error description	Cause of error (details)	Corrective action	Detectability Master station	Detectability Local station
B407	Transient communication number mismatch error	The numbers for request data and response data do not match.	Check the line.	○	○
B510	Sending channel in use (own station)	The selected channel is already in use.	The same channel cannot be used at the same time. Change the channel number or try not to use the same channel at the same time.	○	○
B511	Receiving channel in use	The channel of the target station is already in use.	Execute the mdSend instruction after a while. Check to see if more than one request is made to the channel of the target station from own station and/or multiple stations.	○	○
B512	Arrival wait timeout	The arrival monitor time has exceeded (when the resend count is 0) or the mdReceive instruction was executed when the mdReceive instruction execution request flag was not turned on.	Increase the arrival monitor time if this error occurred in the mdReceive instruction and when another station was executing the SEND instruction (mdSend instruction in case of the CC-Link Ver.2 board). Increase the arrival monitor time when own station was executing an instruction. If the error persists, check the network and target station.	○	○
B513	Number of retries exceeded	The number of retries exceeded the set number.	Increase the arrival monitor time. If the error persists, check the network and target station.	○	○
B515	Channel number error	A channel number is out of the setting range.	Set the channel of own station and target station to "1 or 2."	○	○
B519	Resend count error	The number of resends is out of the setting range.	Set a value in the range from "0 to 15 (times)."	○	○
B51A	Arrival monitor time error	The arrival monitor time is out of the setting range.	Set a value in the range from "0 to 32767 (seconds)."	○	○
B520	Target station number error	"Other than 0" is set for the target station number.	Set the target station number to "0."	○	○
B524	Target station CPU error	The target station's CPU is faulty.	Check the target station's CPU.	○	○
B601	Access code setting error	Nonexistent access code/attribute was set.	Set the correct access code/attribute.	○	○
B602	Transient request overload error	There are too many transient requests to the corresponding station.	Wait a while and then send the requests (transient transmission overload status).	○	○
B603	Transient request overload error	There are too many transient requests to the corresponding station.	Wait a while and then send the requests (transient transmission overload status).	○	○
B604	Line test in progress	A transient transmission was performed while a line test was in progress.	Wait a while and then resend.	○	×
B605	Cannot access the communication buffer.	Access to the communication buffer failed.	Wait a while and then resend.	○	○
B607	Target station CPU error	There is an error in the target station's CPU.	Check the target CPU.	○	○
B771	Transient request overload error	There are too many transient requests to the corresponding station (when the requesting station is the AJ65BT-G4, A8GT-J61BT13 or CC-Link Ver.2 board).	Wait a while and then resend (transient transmission overloaded status).	○	○

Error code (hexadecimal)	Error description	Cause of error (details)	Corrective action	Detectability	
				Master station	Local station
B774	Transient request error	The target station was not an intelligent device station (when the requesting station is the A8GT-J61BT13 or CC-Link Ver.2 board).	Check if the target station is an intelligent device station.	○	○
B778	Response timeout	A response was not received from the requested station (when the requesting station is the A8GT-J61BT13 or CC-Link Ver.2 board).	Check the requested module and cables.	○	○
B780	Module mode setting error	A transient transmission was executed even though the target station was set in the I/O mode.	Set the target station in the intelligent mode.	○	○
B801	Access code setting error	An access code/attribute that does not exist was set.	Set the correct access code/attribute.	○	○
B802	Access code error	An access code that does not exist was used.	Use the correct access code.	○	○
B803	Number of data points error	The number of data points is out of range.	Set the number of data points to a value in the range from "1 to 960 bytes."	○	○
B804	Attribute definition error Specification error of the station not supported transit transmission	Invalid attribute definition, or transient transmission was executed although the target station does not support transient transmission.	Review the attribute definition. Review the specified content of the target station number. Or, check the function version and software version of the target local station.	○	○
B805	Number of data error	The number of data is out of rage.	Set the number of data to a value in the range from "1 to 100" when writing, and "1 to 160" when reading.	○	○
B807	Address definition error	The address was not a multiple of 16 when a bit device was accessed.	Set the address to a multiple of 16 when accessing a bit device.	○	○
B80D	Setting range error	The combination of the set address and number of points exceeded the valid processing range.	Set so that the number of processing points does not exceed the device range.	○	○
B814	File register capacity setting error	The file register capacity was not set.	Set the file register capacity.	○	○
B815	Module mode setting error	A transient transmission was executed even though the target station was set in the I/O mode.	Change it to the intelligent mode.	○	○
B901	E^{2}PROM error	When a parameter registration request (YnA) to E^{2}PROM was executed, the E^{2}PROM was faulty or the write limit (10,000 times) was exceeded.	Replace the module.	○	×
B902	Data link startup error with E^{2}PROM parameters	A data link startup request (Yn8) using an E^{2}PROM parameter was executed even though the parameter has not been registered in the E^{2}PROM.	Register the parameter to E^{2}PROM with a parameter registration request (YnA).	○	×
B903	Transient request error	A transient request was issued to a station that has not allocated a communication buffer area.	Allocate a communication buffer area with a parameter.	○	○
B904	Communication buffer size setting error	The communication buffer size of the corresponding station was out of range when a dedicated instruction was executed.	Set the communication buffer size of the corresponding station within the range.	○	○
B905	Transient data length error	The transient data was longer than the communication buffer size of the corresponding station when a dedicated instruction was executed.	Make the communication buffer size of the corresponding station larger than the transient data length.	○	○
BA19	Corresponding station error	The corresponding station that is being tested stopped communication during line test.	Check the cable and the corresponding station.	○	×

Error code (hexadecimal)	Error description	Cause of error (details)	Corrective action	Detectability	
				Master station	Local station
BA1B	All stations error	All stations stopped communications during line test.	Check the cables.	○	×
BBC1	Mode setting error	The mode setting of a local station is not set to "1."	Set "0."	×	○
BBC2	Station number setting error	The station number setting is set to a value "other than 0 to 64."	Set the value within the range from "0 to 64."	○	○
BBC3	Transmission rate setting error	The transmission rate setting is set to a value "other than 0 to 4."	Set the value within the range from "0 to 4."	○	○
BBC5	Master station duplicate error	A master station already exists.	Review the station number setting switch.	○	×
BBC7	Module error	The module is faulty.	Replace the module.	○	○

17.4 Measures for WDT error occurrence

The following explains the causes of WDT error occurrence in CC-Link Ver.2 board and measures for them.

(1) Cause of WDT error occurrence

The WDT error occurs in CC-Link Ver.2 board as follows:

1) CC-Link Ver.2 driver cannot operate because the PC or OS is hang up.
2) The CPU cannot start to control the CC-Link Ver.2 driver within the WDT time, as the other drive has occupied the CPU processing.

In case 2), the WDT time has to be adjusted, as affected by the operation of the PC or other driver.

For details, refer to (2).

(2) Adjusting WDT Time

Adjust the watchdog timer surveillance time setting value by the Other settings button on <Parameter settings> tab in the CC-Link Ver.2 Utility.

For details on the Other settings screen, refer to Section 9.2.5 (2).

17.5 Precautions for installing other optional board

Executing user program (including the device monitor utility) for each board simultaneously under the following condition may cause an error.

When an error occurs in the user program, take the action shown below.

<Condition>

A personal computer into which the CC-Link Ver.2 board and other optional board are installed and where the resources were allocated automatically by Plug-and-Play is used.

<Action>

(1) Change the positions where the CC-Link Ver.2 board and other optional board are installed.

(2) In the BIOS setup, exchange the IRQs between the CC-Link Ver.2 board and other optional board or change their IRQs.

17.6 Required Items when Making an Inquiry

When making an inquiry after determining that the board is faulty, please provide us with the following information:

(1) Trouble description (in specific)
Example) When starting up after powering on, the message "board Not response" is displayed and the board does not start.

(2) Manufacturer, type and model name of your personal computer

(3) Main memory capacity, hard disk capacity and CPU model name

(4) Operating system name: Windows® XP Professional, Windows® 2000 Professional or other

(5) The slot position where the board is installed and the number of installed boards

(6) Presence of resource conflict (PC device conflict)
• Memory address (head address and occupied size)
• I/O address (head address and occupied size)
• IRQ number and DMA number

(7) Whether or not you have checked the faulty board with another personal computer

(8) Switch settings

(9) The detailed error descriptions of the CC-Link Ver.2 driver registered in Event Viewer

APPENDIX

Appendix 1 Comparisons with CC-Link Ver.1 board and CC-Link module

Differences between the CC-Link Ver.2 board and CC-Link Ver.1 board, and functional comparisons between the CC-Link Ver.2 board and CC-Link module are shown here.

Appendix 1.1 Differences from the CC-Link Ver.1 Board

The following describes the main differences between the CC-Link Ver.2 board (Q80BD-J61BT11N, Q81BD-J61BT11) and the CC-Link Ver.1 board (A80BDE-J61BT11, A80BDE-J61BT13).
For details other than those shown below, refer to Chapter 3.

(1) General Specifications

Item			CC-Link Ver.2 board (Q80BD-J61BT11N, Q81BD-J61BT11)	CC-Link Ver.1 board (A80BDE-J61BT11, A80BDE-J61BT13)
Storage ambient temperature			-25 to 75℃	-20 to 75℃
Operating ambient temperature			5 to 95%RH, No condensation	10 to 90%RH, No condensation
Storage ambient humidity			5 to 95%RH, No condensation	10 to 90%RH, No condensation
Vibration resistance			Conforming to JIS B 3502(2000), IEC 61131-2	Conforming to JIS B 3501, IEC 1131-2
	When there is intermittent Vibration	Sweep Count	10 times each in X, Y and Z axis (80 minutes)	10 times each in X, Y and Z axis (80 minutes)
	When there is continuous Vibration	Sweep Count	10 times each in X, Y and Z axis (80 minutes)	10 times each in X, Y and Z axis (80 minutes)
Shock resistance			Conforming to JIS B 3502(2000), IEC 61131-2 (147m/s^2 (15g), 3 times each in 3 directions XYZ)	Conforming to JIS B 3501, IEC 1131-2 (147m/s^2 (15g), 3 times each in 3 directions XYZ)

∗: The general specifications of the CC-Link Ver.1 board and CC-Link Ver.2 board are the same as that of the A series module and the Q series module respectively.

APP

(2) Performance Specifications

		CC-Link Ver.2 board (Q80BD-J61BT11N, Q81BD-J61BT11)				CC-Link Ver.1 board (A80BDE-J61BT11, A80BDE-J61BT13)
Max. No. of I/O points	Remote I/O (RX,RY)	8192points				2048points
	Remote register (RWw)	2048points				256points
	Remote register (RWr)	2048points				256points
No. of link points par station	Expanded cyclic setting	1 time setup	2 time setup	4 time setup	8 time setup	
	Remote I/O (RX,RY)	32points	32points	64points	128points	32points
	Remote register (RWw)	4points	8points	16points	32points	4points
	Remote register (RWr)	4points	8points	16points	32points	4points
Number of link points par number of occupied station count	Occupies 1 station — Remote I/O (RX,RY)	8points	32points	64points	128points	32points
	Occupies 1 station — Remote register RWw)	4points	8points	16points	32points	4points
	Occupies 1 station — Remote register (RWr)	4points	8points	16points	32points	4points
	Occupies 2 stations — Remote I/O (RX,RY)	64points	96points	192points	384points	64points
	Occupies 2 stations — Remote register RWw)	8points	16points	32points	64points	8points
	Occupies 2 stations — Remote register (RWr)	8points	16points	32points	64points	8points
	Occupies 3 stations — Remote I/O (RX,RY)	96points	160points	320points	640points	96points
	Occupies 3 stations — Remote register RWw)	12points	24points	48points	96points	12points
	Occupies 3 stations — Remote register (RWr)	12points	24points	48points	96points	12points
	Occupies 4 stations — Remote I/O (RX,RY)	128points	224points	448points	896points	128points
	Occupies 4 stations — Remote register RWw)	16points	32points	64points	128points	16points
	Occupies 4 stations — Remote register (RWr)	16points	32points	64points	128points	16points
Transmission delay time	Output transmission delay time	LS × 4 + Output processing time	LS × 8 + Output processing time	LS × 16 + Output processing time	LS × 32 + Output processing time	LS × 3 + Output processing time
	Input transmission delay time	LS × 4 + Input processing time	LS × 8 + Input processing time	LS × 16 + Input processing time	LS × 32 + Input processing time	LS × 3 + Input processing time

(3) CC-Link Board Functions

	CC-Link Ver.2 board (Q80BD-J61BT11N, Q81BD-J61BT11)	CC-Link Ver.1 board (A80BDE-J61BT11, A80BDE-J61BT13)	Reference section
Cyclic points increase function	Available	Unavailable	1.2, 4.4.7
Remote I/O station points setting	Available	Unavailable	1.2, 4.4.6
0-points Setting for the reserved station	Available	Unavailable	4.1
Parameter Saving function	Available	Unavailable	9.2.4
Parameter Reading function	Available	Unavailable	
Parameter Verification function	Available	Unavailable	
SB/SW save function	Available	Unavailable	9.2.2

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(4) MELSEC Data Link Library

Item			CC-Link Ver.2 Board (Q80BD-J61BT11N, Q81BD-J61BT11)		CC-Link Ver.1 Board (A80BDE-J61BT11, A80BDE-J61BT13)
	Offset value	Information			
mdBdVerRead Version information to be read by functions	00H	Password	'S', 'G' fixed		
	01H	Checksum	The sum of 02H to 0FH		
	02H	S/W version	'A' to 'ZZ'		
	03H to 05H	Date	Date (year, month, day) (Exp.) 2005 April 1st: '0' '5' '0' '4' '0' '1'		
	06H, 07H	Reservation area	0000H fixed		
	08H to 0FH	S/W format name	'QJ61BT11N'		'J61BT13', 'J61BT11'
	10H to 17H	H/W format name	'Q80BD-J61BT11N'		'A80BD-J61BT13', 'A80BD-J61BT11'
	18H	2port memory possession size	0200H (512k bytes)		4000H (16k bytes)
	19H	2port attribute	0080H fixed		
	1AH	Useable offset	0000H fixed		
	1BH to 1FH	Machine classification	1BH (L) Function version (H) CC-Link version (higher) 1CH (L) CC-Link version (lower) (H) 0 fixed 1DH to 1FH 0 fixed		'A80BD'

(5) Communication with Intelligent device station (AJ65BT-R2)

Item	CC-Link Ver.2 Board (Q80BD-J61BT11N, Q81BD-J61BT11)	CC-Link Ver.1 Board (A80BDE-J61BT11, A80BDE-J61BT13)
Communication function using the buffer, on the host station (CC-Link Ver.1 Board/CC-Link Ver.2 Board), that can send/receive data	Not available	Available

Appendix 1.2 Functional comparisons with CC-Link module

The main functional comparisons between the CC-Link Ver.2 board (Q80BD-J61BT11N) and CC-Link Module (QJ61BT11N, Q81BD-J61BT11) are shown here. For details of the functions, refer to Chapter 4.

Function			Q80BD-J61BT11N, Q81BD-J61BT11	QJ61BT11N
Cyclic transmission function	Communication in Remote net mode	Compatibility with Remote net ver.2 mode	○＊1	○
		Compatibility with Remote net additional mode	○＊1	○
		Compatibility with Remote net ver.1 mode	○	○
	Communication in Remote I/O net mode		×	○
Transient transmission function	Other station access by GX Developer		○	○
	Other station access by dedicated instructions		×	○
	Other station access by MELSEC data link library		○	×
Standby master function	Standby master function		○	○
	Master station duplex function		×	○
Reserved station function			○	○
Error invalid station setting function			○	○
RAS function	Hardware Test function		○	○
	Automatic return function		○	○
	Slave station cut-off function		○	○
	Temporary error invalid station setting function		×	○
	Slave station refresh/forced clear setting function for programmable controller CPU STOP		×	○
Improved usability	Automatic CC-Link startup		×	○
	Remote device station initialization procedure registration function		×	○
	Event issue function		×	○
	Multiple CPU system support		○	○
	Remote I/O station points setting		○＊1	○
	0-point setting to the reserved station		○＊1	○

○: Supported　×: Not supported

＊1: This function is newly provided to the CC-Link Ver.2 board in addition to the CC-Link Ver.1 board functions.

Appendix 2 Replacing the CC-Link Board

This appendix describes the CC-Link board replacement procedure and precautions.

Appendix 2.1 Replacing a CC-Link Ver.1 Board with a CC-Link Ver.2 Board

This section describes how to replace the CC-Link Ver.1 board currently mounted to the PC with a CC-Link Ver.2 board and precautions to be observed.
Step numbers (1) to (5) in the chart correspond to (1) to (5) in the figure below.

START

Backing up parameters

1) Insert the SWnDNC-CCDB2-B into the CD-ROM drive on the PC.

2) Activate the "Parameter backup/restoration tool" and back up the current parameters. (Save to file.). ···· Refer to Appendix 3.1.1 (1). Refer to Appendix 3.1.2.

Uninstall the software package for the CC-Link Ver.1 board. ···· Refer to section 8.4.4.

Removing the CC-Link Ver.1 board currently in use

3) Turn OFF the PC, and remove the CC-Link Ver.1 board from the PC.

Mounting the new CC-Link Ver.2 board

4) Set the CC-Link Ver.2 board switches, and mount the CC-Link Ver.2 board to the PC. ···· Refer to section 8.3. Refer to section 8.6.

Turn ON the PC, and insert the SWnDNC-CCDB2-B into the CD-ROM drive on the PC.

Install the software package for the CC-Link Ver.2 board. ···· Refer to section 8.4.1(1). Refer to section 8.4.1(2).

Test the CC-Link Ver.2 board. ···· Refer to section 9.2.8.

Restoring parameters

Insert the SWnDNC-CCDB2-B into the CD-ROM drive on the PC.

5) Activate "Parameter backup/restore tool", and restore the parameters. (Reading them from files and saving them to the board.) ···· Refer to Appendix 3.1.1(1). Refer to Appendix 3.1.3.

END

SWnDNC-CCBD2-B

(1) Insert

(2) Back up

(5) Restore
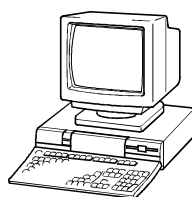
CC-Link Ver.1 board

(3) Remove

CC-Link Ver.2 board

(4) Mount
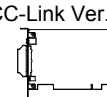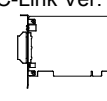
Appendix 2.2 Replacing a CC-Link Ver.2 Board with a CC-Link Ver.1 Board, or a CC-Link Board with Another of the Same Version

The following describes how to replace a CC-Link Ver.2 board with a CC-Link Ver.1 board, or a CC-Link board with another of the same version.

(1) When replacing a CC-Link Ver.2 board with a CC-Link Ver.1 board, change the terms shown in Appendix 2.1 as follows:
   • Changing a CC-Link Ver.1 board to a CC-Link Ver.2 board.
   • Changing a CC-Link Ver.2 board to a CC-Link Ver.1 board.

(2) When replacing a CC-Link board with another of the same version, the following steps shown in Appendix 2.1 are not required.
   • Backup and restoration of CC-Link board parameters
   • Uninstallation and reinstallation of software packages

Appendix 2.3 Precautions

This section provides the precautions for CC-Link board replacement.

(1) When multiple CC-Link boards are mounted on the same PC, all the boards must be of the same version.
   (Example) When replacing a CC-Link Ver.1 board with a CC-Link Ver.2 board
   Replace all CC-Link Ver.1 boards currently mounted on the PC with CC-Link Ver.2 boards.

(2) To re-use the parameters, back up them before uninstall the CC-Link Utility.
   (Example) When replacing a CC-Link Ver.1 board with a CC-Link Ver.2 board
   Back up the parameters of the CC-Link Ver.1 board, and then uninstall the CC-Link Ver.1 Utility.

(3) Install only the software package of the same version as the CC-Link board currently mounted.
   (Example) When a CC-Link Ver.2 board is mounted
   Uninstall the CC-Link Ver.1 board software package, and then install the CC-Link Ver.2 board software package.

(Compatibility between CC-Link boards and software packages)[1]

	CC-Link Ver.1 Board Software Package	CC-Link Ver.2 Board Software Package
CC-Link Ver.1 board	○	×
CC-Link Ver.2 board	×	○

○: Compatible   ×: Not compatible

[1]: The following conditions are found when the installed software package is not compatible with the CC-Link board currently mounted.

[Conditions]
 • A parameter error occurs when the CC-Link system is started up.
 • The information of the CC-Link Ver.2 board is displayed on the CC-Link Ver.1 Utility.
 • A parameter read error occurs when the CC-Link Ver.1 Utility is started up.
 • The CC-Link Ver.1 Utility does not run correctly.
   (An error such as a display error or an application error occurs.)
 • The message, "An attempt to link a device name has failed." is displayed in the event viewer.

(4) Prevent different versions of software packages from being installed together. The following describes how to check the utilities and drivers for coexistence of different version software packages.

(a) How to check the utility version

The version can be checked by [Start] - [Settings] - [Control Panel] - "Adding/Deleting Applications"[*1].

∗1: When using Windows® XP and Windows® 7, select "Add/Remove Programs". When using Windows Vista®, select "Uninstall a program".

(Utility names displayed)
CC-Link Ver.1 Utility: SWnDNF-CCLINK-B
CC-Link Ver.2 Utility: SW1DNC-CCBD2-B

When the name of the utility that is not compatible with the mounted CC-Link board is displayed, perform the following:
• Uninstall the utility that is not compatible with the CC-Link board. (Refer to section 8.4.4.)

(b) How to check the driver version

The version can be checked by [Start] - [Settings] - [Control Panel] [*1] - [System] - <<Hardware>> tab - |Device Manager| button (Windows 2000/XP/Vista/7 only).

(Driver names displayed)
CC-Link Ver.1 driver: PCI MELSEC CC-LINK Controller
CC-Link Ver.2 driver: PCI MELSEC CC-LINK Ver.2 Controller

When both of the above drive names are displayed concurrently, it means the CC-Link Ver.1 board and CC-Link Ver.2 board have been mounted. Perform the following:

• Click [Start] - [Settings] - [Control Panel] [*1] - [System] - <<Hardware>> tab - |Device Manager| button (Windows 2000/XP/Vista/7 only).
• On the Device Manager screen, click "MELSEC CC-LINK Device".
• Select the driver of the unnecessary CC-Link board version, right-click and select "Delete".
• Remove the CC-Link board of the version not to be used. [*2]

∗1: When using Windows Vista®, select [Classic View] on the control panel screen.
∗2: For details on how to check the CC-Link Ver.2 board version, refer to section 2.2.4(3).

Appendix 3 About "Parameter backup/restore tool"

This section describes the "Parameter backup/restore tool" that is used for re-using existing parameters.

The "Parameter backup/restore tool" is a dedicated tool for backing up and restoring CC-Link board parameters, and is stored in the SW1DNC-CCBD2-B CD-ROM.

   (Backup)
     Stores parameters of the CC-Link board that is currently mounted to the PC into files.
   (Restore)
     Reads the backed-up parameters and stores them into a CC-Link board.

By using this dedicated tool, the user can re-use existing parameters without being aware of the version of the CC-Link board.

Appendix 3.1 Operation Procedure

The following explains the operations of "Parameter backup/restore tool."

Appendix 3.1.1 Starting and exiting the tool

(1) Starting the tool
The following describes how to start "Parameter backup/restore tool".

(a) Insert SW1DNC-CCBD2-B into the CD-ROM drive.

(b) Click [Start] - [Run].
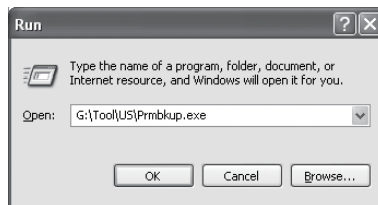
(c) Click the Browse button in the "Run" dialog box and select the Parameter backup/restore tool (PrmBkup.exe[*1]).

   *1: "PrmBkup.exe" is stored in the following folder:
      <CD-ROM drive>-<Tool>-<US>

(d) Check the displayed path, then click the OK button.
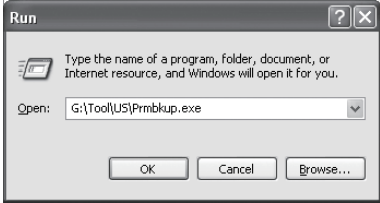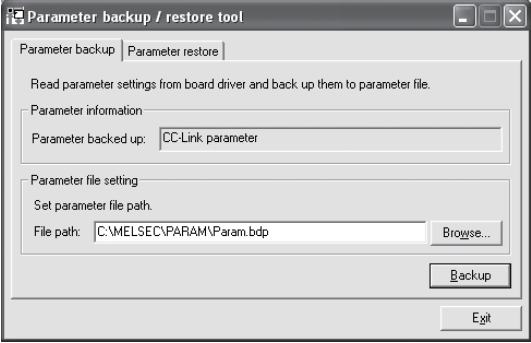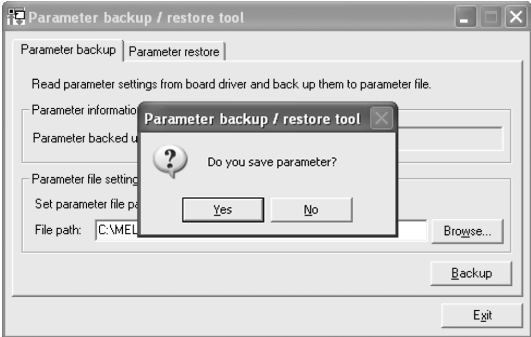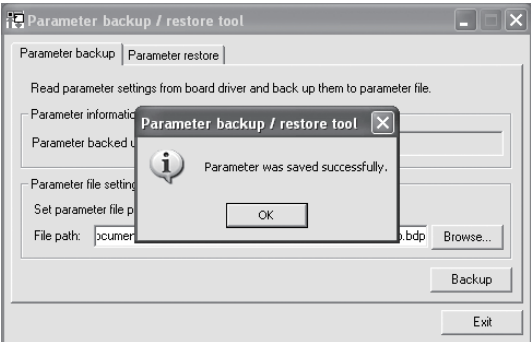
(e) The "Parameter backup/restore tool" dialog box is displayed.

(2) Exiting the tool
To exit the "Parameter backup/restoration tool," click [Close(C)] in the system menu, the X button at the top right of the dialog box, or END button at the bottom of the screen.

Appendix 3.1.2 Backing up parameters

The following describes the procedure for backing up parameters.

(1) Activate the "Parameter backup/restore tool."
(Refer to Appendix 3.1.1.)

↓
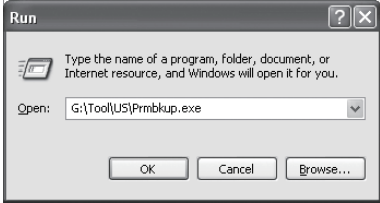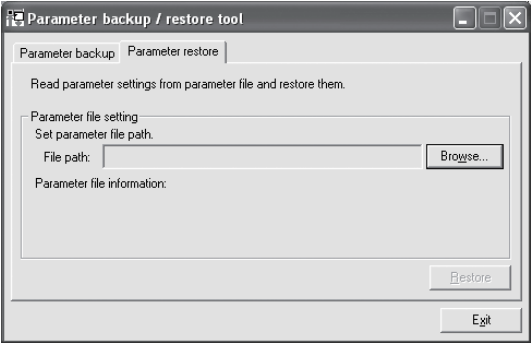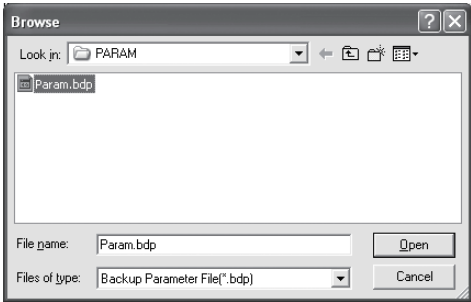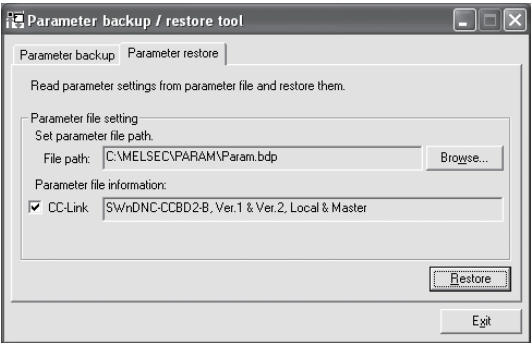
(2) Select the "Parameter backup" tab in the "Parameter backup/restore tool" dialog box.
Enter the destination where the parameters are to be backed up in the "Parameter file setting" field.
You can also specify the backup destination in the "Open File" dialog box by clicking the ⌷Browse⌷ button.

↓

(3) After specifying the backup destination, click the ⌷Backup⌷ button. The confirmation dialog box is displayed.
Click the ⌷Yes⌷ button. The parameters are backed up to the specified file.

↓

(4) When the backup ends successfully, the dialog box on the left is displayed.
Click the ⌷OK⌷ button to end the backup.

↓

(End)

POINT
All of the CC-Link board parameters currently stored in the PC are backed up.

Appendix 3.1.3 Restoring parameters

The following describes the procedure for restoring parameters.

(1) Activate the "Parameter backup/restore tool." (Refer to Appendix 3.2.1.)

↓

(2) Select the "Parameter restore" tab in the "Parameter backup/restore tool" dialog box. (Refer to Appendix 3.3.2.)
Click the |Browse| button in the "Parameter file setting" field. The "Browse" dialog box is displayed.

↓

(3) Select the parameter file to be restored, and click the |Open| button.

↓

(4) The information of the selected file is displayed in the "Parameter file information" field under the "Parameter file setting".
Click the |Restore| button. The confirmation dialog box is displayed.
Click the |Yes| button to restore the parameters.

↓

(To the next page)

(From the previous page)
↓
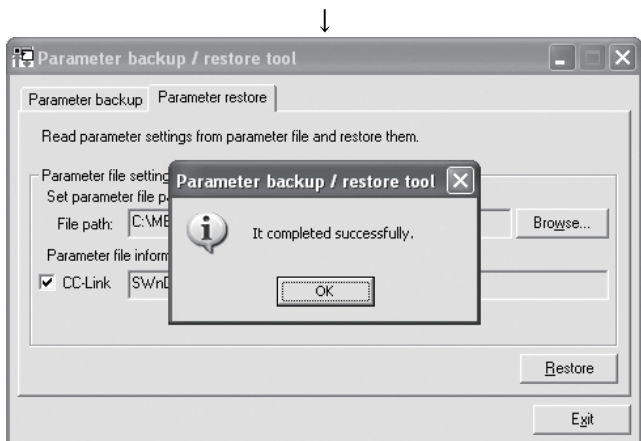
(5) When the restoration ends successfully, the dialog box on the left is displayed.
Click the $\boxed{\text{OK}}$ button to end the restoration.

↓
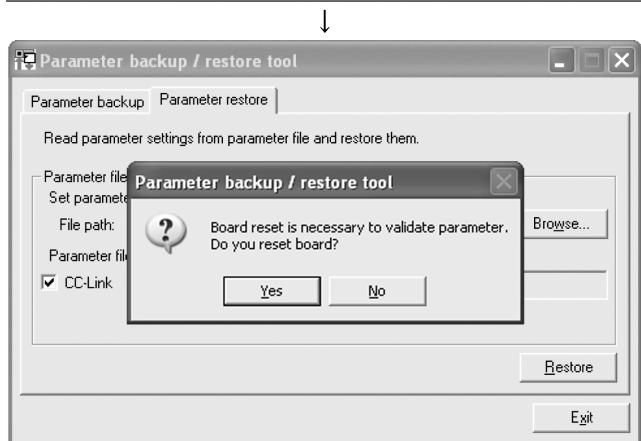
(6) The CC-Link board reset request is displayed.
To make restored parameters effective, click the $\boxed{\text{Yes}}$ button.
The CC-Link board is reset.

↓
(End)

Appendix 3.1.4 How to check the version

The following shows how to check the version of the "Parameter backup/restore tool."

(1) Right-click the title bar of the "Parameter backup/restore tool" screen, or click the icon (⬚).

(2) Click "Version information" in the system menu.
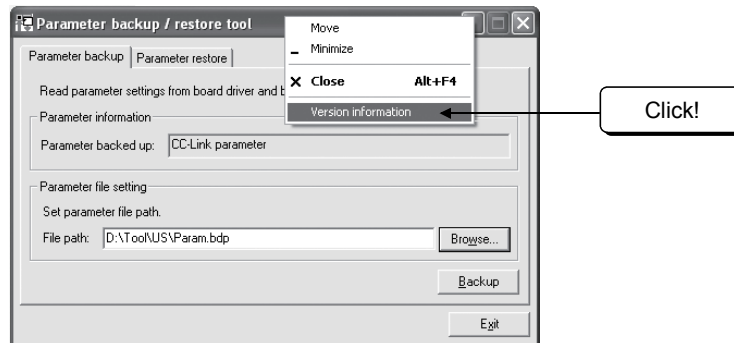
(3) The version of the "Parameter backup/restore tool" is displayed.

Appendix 3.2 Precautions When Using "Parameter backup/restoration tool"

The following are the precautions for using the "Parameter backup/restoration tool."

(1) Precautions when activating "Parameter backup/restoration tool"
Back up or restore parameters with the CC-Link Utility already installed.

(2) Restrictions on restoration
The following table shows whether backed-up parameters can be restored or not for each case.

Backed-up parameters		Restored to	Windows95, Windows98	Windows NT, Windows 2000, Windows XP		Windows Server 2003 R2, Windows Vista, Windows Server 2008, Windows 7
			CC-Link Ver.1 board (SWnDNF-CCLINK-B)	CC-Link Ver.1 board (SW1DNF-CCLINK-B)	CC-Link Ver.2 board (SW1DNC-CCBD2-B)	CC-Link Ver.2 board (SW1DNC-CCBD2-B)
CC-Link Ver.1 board (SWnDNF-CCLINK-B)	ver.1 mode	Master/standby master station parameters	×	○	○	○
		Local station parameters	○	○	○	○
CC-Link Ver.2 board (SW1DNC-CCBD2-B)	ver.1 mode	Master/standby master station parameters	×	○	○	○
		Local station parameters	○	○	○	○
	ver.2 mode	Master/standby master station parameters	×	×	○	○
		Local station parameters	×	×	○	○
	Additional mode	Master/standby master station parameters	×	×	○	○
		Local station parameters	×	×	○	○

○ : Can be restored   × : Cannot be restored

(3) File name and file path entered when backing up parameters
The following table shows the maximum number of characters that can be entered and the characters not to be used when entering file names and file paths.

File Name Length/Path Length	Illegal Characters
255 characters	＊ : < > ? | "

Appendix 4 Buffer Memory

"Buffer memory" is a memory area used for data transfer between the user program and the CC-Link Ver.2 board.

The data of the buffer memory return to their defaults when the CC-Link Ver.2 board is reset by powering OFF the PC or resetting the CC-Link Ver.2 Utility.

Appendix 4.1 Buffer memory list

The buffer memory list is shown.

Buffer memory list (1/3)

Address		Item	Description	Read/write possibility	Availability		Reference section
Hexadecimal	Decimal				Master station	Local station	
0000$_H$ to 00DF$_H$	0 to 223	Use prohibited *1	—	—	—	—	—
00E0$_H$ to 0015F$_H$	224 to 351	Remote input (RX) *2	For the master station: Stores the input status from the remote/local/ intelligent device/standby master stations.	Read only	○	—	Appendix 4.2(1)
			For the local station: Stores the input status from the master station.		—	○	
0160$_H$ to 01DF$_H$	352 to 479	Remote output (RY) *2	For the master station: Stores the output status to the remote/local/intelligent device/standby master stations.	Write only	○	—	
			For the local station: Stores the output status to the master station. Also, stores the receive data from the remote/other local/intelligent device/ standby master stations.	Read/write enabled	—	○	

○: Available, — : Not available

＊1: Do not write to any area where use is prohibited. This may cause errors.

＊2: Used when the remote net ver.1 mode or remote net additional mode is selected.

Buffer memory list (2/3)

Address		Item	Description	Read/write possibility	Availability		Reference section
Hexadecimal	Decimal				Master station	Local station	
01E0H to 02DFH	480 to 735	Remote register (RWw) *2 Master station: For sending Local station: For sending/receiving	For the master station: Stores the send data to the remote device/all local/ intelligent device/standby master stations.	Write only	○	—	Appendix 4.2(2)
			For the local station: Stores the send data to the master/other local/ intelligent device/standby master stations. Also, stores the receive data from the remote device/other local/ intelligent device/standby master stations.	Read/write enabled	—	○	
02E0H to 03DFH	736 to 991	Remote register (RWr) *2 Master station: For receiving Local station: For receiving	For the master station: Stores the receive data from the remote device/ local/intelligent device/ standby master stations.	Read only	○	—	Appendix 4.2(2)
			For the local station: Stores the receive data from the master station.		—	○	
03E0H to 05DFH	992 to 1503	Slave station offset and size information	Stores offset and size information of RX/RY/RWw/RWr for each remote station, local station, intelligent device station, and standby master station.	Read only	○	○	—
05E0H to 05FFH	1504 to 1535	Link special relay (SB)	Stores the data link status.	Read/write enabled (write may be disabled depending on the device)	○	○	Appendix 4.2(3)
0600H to 07FFH	1536 to 2047	Link special register (SW)	Stores the data link status.		○	○	Appendix 4.2(4)
0800H to 09FFH	2048 to 2559	Use prohibited *1	—	—	—	—	—
0A00H to 0FFFH	2560 to 4095	Random access buffer	The specified data is stored and used by transient transmission.	Read/write enabled	○	○	Appendix 4.2(5)
1000H to 1FFFH	4096 to 8191	Use prohibited *1	—	—	—	—	—
2000H to 2FFFH	8192 to 12287	Automatic update buffer	Stores the automatic update data when performing transient transmission with the AJ65BT-R2 (communication using the automatic update buffer).	Read/write enabled	○	○	Appendix 4.2(6)
3000H to 3FFFH	12288 to 16383	Use prohibited *1	—	—	—	—	—

○: Available, — : Not available

*1: Do not write to any area where use is prohibited. This may cause errors.

*2: Used when the remote net ver.1 mode or remote net additional mode is selected.

Buffer memory list (3/3)

Address		Item	Description	Read/write possibility	Availability		Reference section
Hexadecimal	Decimal				Master station	Local station	
4000H to 41FFH	16384 to 16895	Ver.2 compatible remote input (RX) *3	For the master station: Stores the input status from the remote/local/ intelligent device/standby master stations.	Read only	○	—	Appendix 4.2(7)
			For the local station: Stores the input status from the master station.		—	○	
4200H to 43FFH	16896 to 17407	Ver.2 compatible remote output (RY) *3	For the master station: Stores the output status to the remote/local/intelligent device/standby master stations.	Write only	○	—	
			For the local station: Stores the output status from the master station. Also, stores the receive data from the remote/ other local/intelligent device/standby master stations.	Read/write enabled	—	○	
4400H to 4BFFH	17408 to 19455	Ver.2 compatible remote register (RWw) *3 Master station: For sending Local station: For sending/receiving	For the master station: Stores the send data to the remote device/all local /intelligent device/standby master stations.	Write only	○	—	Appendix 4.2(8)
			For the local station: Stores the send data to the master/other local/ intelligent device/standby master stations. Also, stores the receive data from the remote device/other local/ intelligent device/standby master stations.	Read/write enabled	—	○	
4C00H to 53FFH	19456 to 21503	Ver.2 compatible remote register (RWr) *3 Master station: For receiving Local station: For receiving	For the master station: Stores the receive data from the remote device/ other local/intelligent device/standby master stations.	Read only	○	—	
			For the local station: Stores the receive data from the master station.		—	○	
5400H to 7FFFH	21504 to 32767	Use prohibited *1	—	—	—	—	—

○: Available, — : Not available

*1: Do not write to any area where use is prohibited. This may cause errors.

*3 :Used when the remote net ver.2 mode or remote net additional mode is selected.

Appendix 4.2 Buffer memory details

The following describes the details of the items shown in the buffer memory list in Appendix 4.1.

(1) Remote input (RX) and remote output (RY)

When the remote net ver.1 mode or remote net additional mode is selected, the number of points indicated below is used.

(a) Master station ← remote I/O station/remote device station/local station

1) Master station
- The input status from the remote I/O station, remote device station (RX) and local station (RY) is stored.
- Two words (32 points) are used per station.

2) Local station
- Data to be sent to the master station is stored in the remote output (RY) of the address corresponding to the host station number.
- The input status from the remote I/O station, remote device station (RX) and other local station is stored.
- Two words (32 points) are used per station.

▌ … The last two bits cannot be used for communication between the master station and the local station.
(In the example below, RY9E and RY9F cannot be used.)

Master station   Remote I/O station (Station number 1: occupies 1 station)   Local station (Station number 2: occupies 4 stations)

Address	Remote input (RX)		Remote output (RY)	Address	
For station number 1	E0$_H$ RX F to RX 0 E1$_H$ RX 1F to RX 10	X0F to X00 X1F to X10	RY F to RY 0 RY 1F to RY 10	160$_H$ 161$_H$	For station number 1
For station number 2	E2$_H$ RX 2F to RX 20 E3$_H$ RX 3F to RX 30		RY 2F to RY 20 RY 3F to RY 30	162$_H$ 163$_H$	For station number 2
For station number 3	E4$_H$ RX 4F to RX 40 E5$_H$ RX 5F to RX 50		RY 4F to RY 40 RY 5F to RY 50	164$_H$ 165$_H$	For station number 3
For station number 4	E6$_H$ RX 6F to RX 60 E7$_H$ RX 7F to RX 70		RY 6F to RY 60 RY 7F to RY 70	166$_H$ 167$_H$	For station number 4
For station number 5	E8$_H$ RX 8F to RX 80 E9$_H$ ▌RX 9D to RX 90		RY 8F to RY 80 ▌RY 9D to RY 90	168$_H$ 169$_H$	For station number 5
	to to		to	to	
For station number 63	15C$_H$ RX7CF to RX7C0 15D$_H$ RX7DF to RX7D0		RY7CF to RY7C0 RY7DF to RY7D0	1DC$_H$ 1DD$_H$	For station number 63
For station number 64	15E$_H$ RX7EF to RX7E0 15F$_H$ RX7FF to RX7F0		RY7EF to RY7E0 RY7FF to RY7F0	1DE$_H$ 1DF$_H$	For station number 64

The following tables show the station numbers and corresponding buffer-memory addresses.

[Master station]

Table of station numbers and corresponding buffer memory addresses

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	E0$_H$ to E1$_H$	14	FA$_H$ to FB$_H$	27	114$_H$ to 115$_H$	40	12E$_H$ to 12F$_H$	53	148$_H$ to 149$_H$
2	E2$_H$ to E3$_H$	15	FC$_H$ to FD$_H$	28	116$_H$ to 117$_H$	41	130$_H$ to 131$_H$	54	14A$_H$ to 14B$_H$
3	E4$_H$ to E5$_H$	16	FE$_H$ to FF$_H$	29	118$_H$ to 119$_H$	42	132$_H$ to 133$_H$	55	14C$_H$ to 14D$_H$
4	E6$_H$ to E7$_H$	17	100$_H$ to 101$_H$	30	11A$_H$ to 11B$_H$	43	134$_H$ to 135$_H$	56	14E$_H$ to 14F$_H$
5	E8$_H$ to E9$_H$	18	102$_H$ to 103$_H$	31	11C$_H$ to 11D$_H$	44	136$_H$ to 137$_H$	57	150$_H$ to 151$_H$
6	EA$_H$ to EB$_H$	19	104$_H$ to 105$_H$	32	11E$_H$ to 11F$_H$	45	138$_H$ to 139$_H$	58	152$_H$ to 153$_H$
7	EC$_H$ to ED$_H$	20	106$_H$ to 107$_H$	33	120$_H$ to 121$_H$	46	13A$_H$ to 13B$_H$	59	154$_H$ to 155$_H$
8	EE$_H$ to EF$_H$	21	108$_H$ to 109$_H$	34	122$_H$ to 123$_H$	47	13C$_H$ to 13D$_H$	60	156$_H$ to 157$_H$
9	F0$_H$ to F1$_H$	22	10A$_H$ to 10B$_H$	35	124$_H$ to 125$_H$	48	13E$_H$ to 13F$_H$	61	158$_H$ to 159$_H$
10	F2$_H$ to F3$_H$	23	10C$_H$ to 10D$_H$	36	126$_H$ to 127$_H$	49	140$_H$ to 141$_H$	62	15A$_H$ to 15B$_H$
11	F4$_H$ to F5$_H$	24	10E$_H$ to10F$_H$	37	128$_H$ to 129$_H$	50	142$_H$ to 143$_H$	63	15C$_H$ to 15D$_H$
12	F6$_H$ to F7$_H$	25	110$_H$ to 111$_H$	38	12A$_H$ to 12B$_H$	51	144$_H$ to 145$_H$	64	15E$_H$ to 15F$_H$
13	F8$_H$ to F9$_H$	26	112$_H$ to 113$_H$	39	12C$_H$ to 12D$_H$	52	146$_H$ to 147$_H$	—	—

[Local station]

Table of station numbers and corresponding buffer memory addresses

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	160$_H$ to 161$_H$	14	17A$_H$ to 17B$_H$	27	194$_H$ to 195$_H$	40	1AE$_H$ to 1AF$_H$	53	1C8$_H$ to 1C9$_H$
2	162$_H$ to 163$_H$	15	17C$_H$ to 17D$_H$	28	196$_H$ to 197$_H$	41	1B0$_H$ to 1B1$_H$	54	1CA$_H$ to 1CB$_H$
3	164$_H$ to 165$_H$	16	17E$_H$ to 17F$_H$	29	198$_H$ to 199$_H$	42	1B2$_H$ to 1B3$_H$	55	1CC$_H$ to 1CD$_H$
4	166$_H$ to 167$_H$	17	180$_H$ to 181$_H$	30	19A$_H$ to 19B$_H$	43	1B4$_H$ to 1B5$_H$	56	1CE$_H$ to 1CF$_H$
5	168$_H$ to 169$_H$	18	182$_H$ to 183$_H$	31	19C$_H$ to 19D$_H$	44	1B6$_H$ to 1B7$_H$	57	1D0$_H$ to 1D1$_H$
6	16A$_H$ to 16B$_H$	19	184$_H$ to 185$_H$	32	19E$_H$ to 19F$_H$	45	1B8$_H$ to 1B9$_H$	58	1D2$_H$ to 1D3$_H$
7	16C$_H$ to 16D$_H$	20	186$_H$ to 187$_H$	33	1A0$_H$ to 1A1$_H$	46	1BA$_H$ to 1BB$_H$	59	1D4$_H$ to 1D5$_H$
8	16E$_H$ to 16F$_H$	21	188$_H$ to 189$_H$	34	1A2$_H$ to 1A3$_H$	47	1BC$_H$ to 1BD$_H$	60	1D6$_H$ to 1D7$_H$
9	170$_H$ to 171$_H$	22	18A$_H$ to 18B$_H$	35	1A4$_H$ to 1A5$_H$	48	1BE$_H$ to 1BF$_H$	61	1D8$_H$ to 1D9$_H$
10	172$_H$ to 173$_H$	23	18C$_H$ to 18D$_H$	36	1A6$_H$ to 1A7$_H$	49	1C0$_H$ to 1C1$_H$	62	1DA$_H$ to 1DB$_H$
11	174$_H$ to 175$_H$	24	18E$_H$ to 18F$_H$	37	1A8$_H$ to 1A9$_H$	50	1C2$_H$ to 1C3$_H$	63	1DC$_H$ to 1DD$_H$
12	176$_H$ to 177$_H$	25	190$_H$ to 191$_H$	38	1AA$_H$ to 1AB$_H$	51	1C4$_H$ to 1C5$_H$	64	1DE$_H$ to 1DF$_H$
13	178$_H$ to 179$_H$	26	192$_H$ to 193$_H$	39	1AC$_H$ to 1AD$_H$	52	1C6$_H$ to 1C7$_H$	—	—

(b) Master station → remote I/O station/remote device station/local station

1) Master station
- The output status to the remote I/O station, remote device station (RY) and all local stations (RX) is stored.
- Two words (32points) are used per station.

2) Local station
- The data received from the remote I/O station, remote device station (RY) and master station (RY) is stored.
- Two words (32points) are used per station.

▌▌ … The last two bits cannot be used for communication between the master station and the local station.
(In the example below, RY9E and RY9F cannot be used.)

		Master station		Remote I/O station (Station number 1: occupies 1 station)	Local station (Station number 2: occupies 4 stations)			
	Address	Remote output (RY)			Remote input (RX)		Address	
For station number 1	160H	RY F to RY 0		Y0F to Y00	RX F to RX 0		E0H	For station number 1
	161H	RY 1F to RY 10		Y1F to Y10	RX 1F to RX 10		E1H	
For station number 2	162H	RY 2F to RY 20			RX 2F to RX 20		E2H	For station number 2
	163H	RY 3F to RY 30			RX 3F to RX 30		E3H	
For station number 3	164H	RY 4F to RY 40			RX 4F to RX 40		E4H	For station number 3
	165H	RY 5F to RY 50			RX 5F to RX 50		E5H	
For station number 4	166H	RY 6F to RY 60			RX 6F to RX 60		E6H	For station number 4
	167H	RY 7F to RY 70			RX 7F to RX 70		E7H	
For station number 5	168H	RY 8F to RY 80			RX 8F to RX 80		E8H	For station number 5
	169H	RY 9D to RY 90			RX 9D to RX 90		E9H	
	to	to			to		to	
For station number 63	1DCH	RY7CF to RY7C0			RX7CF to RX7C0		15CH	For station number 63
	1DDH	RY7DF to RY7D0			RX7DF to RX7D0		15DH	
For station number 64	1DEH	RY7EF to RY7E0			RX7EF to RX7E0		15EH	For station number 64
	1DFH	RY7FF to RY7F0			RX7FF to RX7F0		15FH	

The following tables show the station numbers and corresponding buffer memory addresses.

[Master station]
Table of station numbers and corresponding buffer memory addresses

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	160H to 161H	14	17AH to 17BH	27	194H to 195H	40	1AEH to 1AFH	53	1C8H to 1C9H
2	162H to 163H	15	17CH to 17DH	28	196H to 197H	41	1B0H to 1B1H	54	1CAH to 1CBH
3	164H to 165H	16	17EH to 17FH	29	198H to 199H	42	1B2H to 1B3H	55	1CCH to 1CDH
4	166H to 167H	17	180H to 181H	30	19AH to 19BH	43	1B4H to 1B5H	56	1CEH to 1CFH
5	168H to 169H	18	182H to 183H	31	19CH to 19DH	44	1B6H to 1B7H	57	1D0H to 1D1H
6	16AH to 16BH	19	184H to 185H	32	19EH to 19FH	45	1B8H to 1B9H	58	1D2H to 1D3H
7	16CH to 16DH	20	186H to 187H	33	1A0H to 1A1H	46	1BAH to 1BBH	59	1D4H to 1D5H
8	16EH to 16FH	21	188H to 189H	34	1A2H to 1A3H	47	1BCH to 1BDH	60	1D6H to 1D7H
9	170H to 171H	22	18AH to 18BH	35	1A4H to 1A5H	48	1BEH to 1BFH	61	1D8H to 1D9H
10	172H to 173H	23	18CH to 18DH	36	1A6H to 1A7H	49	1C0H to 1C1H	62	1DAH to 1DBH
11	174H to 175H	24	18EH to 18FH	37	1A8H to 1A9H	50	1C2H to 1C3H	63	1DCH to 1DDH
12	176H to 177H	25	190H to 191H	38	1AAH to 1ABH	51	1C4H to 1C5H	64	1DEH to 1DFH
13	178H to 179H	26	192H to 193H	39	1ACH to 1ADH	52	1C6H to 1C7H	—	—

[Local station]
Table of station numbers and corresponding buffer memory addresses

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	E0H to E1H	14	FAH to FBH	27	114H to 115H	40	12EH to 12FH	53	148H to 149H
2	E2H to E3H	15	FCH to FDH	28	116H to 117H	41	130H to 131H	54	14AH to 14BH
3	E4H to E5H	16	FEH to FFH	29	118H to 119H	42	132H to 133H	55	14CH to 14DH
4	E6H to E7H	17	100H to 101H	30	11AH to 11BH	43	134H to 135H	56	14EH to 14FH
5	E8H to E9H	18	102H to 103H	31	11CH to 11DH	44	136H to 137H	57	150H to 151H
6	EAH to EBH	19	104H to 105H	32	11EH to 11FH	45	138H to 139H	58	152H to 153H
7	ECH to EDH	20	106H to 107H	33	120H to 121H	46	13AH to 13BH	59	154H to 155H
8	EEH to EFH	21	108H to 109H	34	122H to 123H	47	13CH to 13DH	60	156H to 157H
9	F0H to F1H	22	10AH to 10BH	35	124H to 125H	48	13EH to 13FH	61	158H to 159H
10	F2H to F3H	23	10CH to 10DH	36	126H to 127H	49	140H to 141H	62	15AH to 15BH
11	F4H to F5H	24	10EH to10FH	37	128H to 129H	50	142H to 143H	63	15CH to 15DH
12	F6H to F7H	25	110H to 111H	38	12AH to 12BH	51	144H to 145H	64	15EH to 15FH
13	F8H to F9H	26	112H to 113H	39	12CH to 12DH	52	146H to 147H	—	—

(2) Remote registers (RWw) and (RWr)
When the remote net ver.1 mode or remote net additional mode is selected, the number of words indicated below is used.

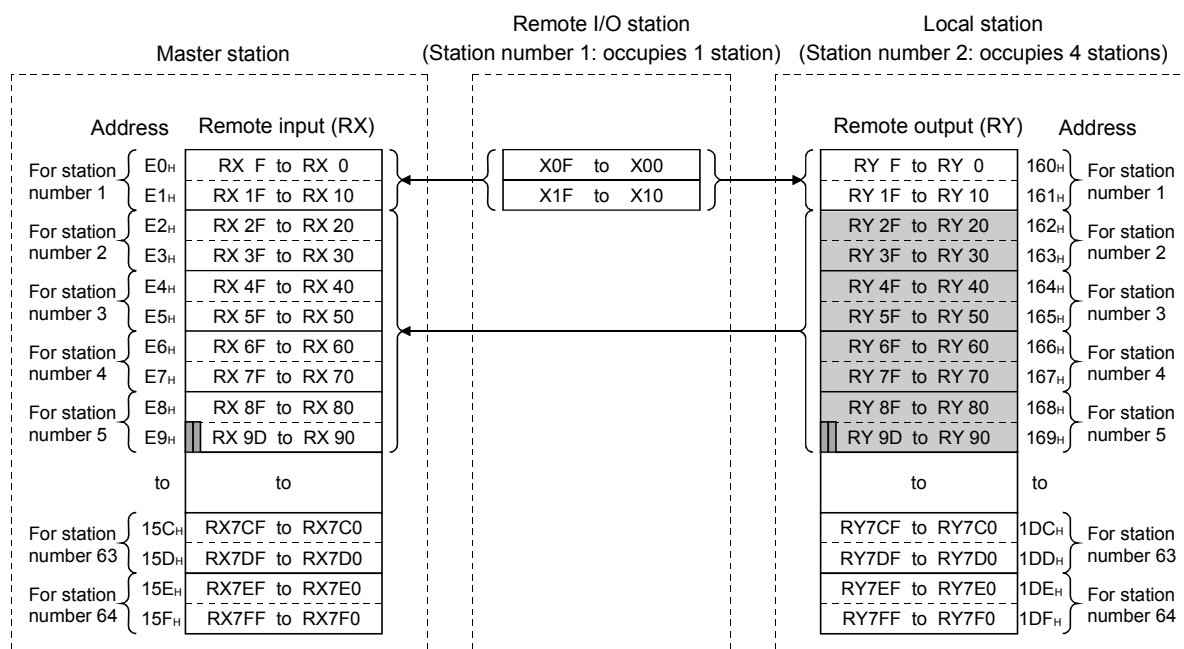(a) Master station (RWw) → remote device station (RWw)/local station (RWr)

1) Master station
- The data to be sent to the remote register (RWw) of the remote device station and the remote registers (RWr) of all local stations are stored.
- Four words are used per station.

2) Local station
- The data sent to the remote register (RWw) of the remote device station can also be received.
- Four words are used per station.

	Master station		Remote device station (Station number 1: occupies 1 station)	Local station (Station number 2: occupies 4 stations)	
	Address	Remote register (RWw)	Remote register (RWw)	Remote register (RWr)	Address
For station number 1	1E0$_H$	RWw 0	RWw 0	RWr 0	2E0$_H$
	1E1$_H$	RWw 1	RWw 1	RWr 1	2E1$_H$
	1E2$_H$	RWw 2	RWw 2	RWr 2	2E2$_H$
	1E3$_H$	RWw 3	RWw 3	RWr 3	2E3$_H$
For station number 2	1E4$_H$	RWw 4		RWr 4	2E4$_H$
	1E5$_H$	RWw 5		RWr 5	2E5$_H$
	1E6$_H$	RWw 6		RWr 6	2E6$_H$
	1E7$_H$	RWw 7		RWr 7	2E7$_H$
For station number 3	1E8$_H$	RWw 8		RWr 8	2E8$_H$
	1E9$_H$	RWw 9		RWr 9	2E9$_H$
	1EA$_H$	RWw A		RWr A	2EA$_H$
	1EB$_H$	RWw B		RWr B	2EB$_H$
For station number 4	1EC$_H$	RWw C		RWr C	2EC$_H$
	1ED$_H$	RWw D		RWr D	2ED$_H$
	1EE$_H$	RWw E		RWr E	2EE$_H$
	1EF$_H$	RWw F		RWr F	2EF$_H$
For station number 5	1F0$_H$	RWw 10		RWr 10	2F0$_H$
	1F1$_H$	RWw 11		RWr 11	2F1$_H$
	1F2$_H$	RWw 12		RWr 12	2F2$_H$
	1F3$_H$	RWw 13		RWr 13	2F3$_H$
	to	to		to	to
For station number 64	2DC$_H$	RWw FC		RWr FC	3DC$_H$
	2DD$_H$	RWw FD		RWr FD	3DD$_H$
	2DE$_H$	RWw FE		RWr FE	3DE$_H$
	2DF$_H$	RWw FF		RWr FF	3DF$_H$

(b) Master station (RWr) ← remote device station (RWr)/local station (RWw)

1) Master station
• The send data from the remote register (RWr) of the remote device station and the remote register (RWw) of the local station is stored.
• Four words are used per station.

2) Local station
• Data is sent to the master station and other local stations by storing it in the address corresponding to the host station number.
• Data in the remote register (RWr) of the remote device station can also be received.
• Four words are used per station.

	Master station		Remote device station (Station number 1: occupies 1 station)	Local station (Station number 2: occupies 4 stations)		
	Address	Remote register (RWr)	Remote register (RWr)	Remote register (RWw)	Address	
For station number 1	2E0H	RWr 0	RWr 0	RWw 0	1E0H	For station number 1
	2E1H	RWr 1	RWr 1	RWw 1	1E1H	
	2E2H	RWr 2	RWr 2	RWw 2	1E2H	
	2E3H	RWr 3	RWr 3	RWw 3	1E3H	
For station number 2	2E4H	RWr 4		RWw 4	1E4H	For station number 2
	2E5H	RWr 5		RWw 5	1E5H	
	2E6H	RWr 6		RWw 6	1E6H	
	2E7H	RWr 7		RWw 7	1E7H	
For station number 3	2E8H	RWr 8		RWw 8	1E8H	For station number 3
	2E9H	RWr 9		RWw 9	1E9H	
	2EAH	RWr A		RWw A	1EAH	
	2EBH	RWr B		RWw B	1EBH	
For station number 4	2ECH	RWr C		RWw C	1ECH	For station number 4
	2EDH	RWr D		RWw D	1EDH	
	2EEH	RWr E		RWw E	1EEH	
	2EFH	RWr F		RWw F	1EFH	
For station number 5	2F0H	RWr 10		RWw 10	1F0H	For station number 5
	2F1H	RWr 11		RWw 11	1F1H	
	2F2H	RWr 12		RWw 12	1F2H	
	2F3H	RWr 13		RWw 13	1F3H	
	to	to		to	to	
For station number 64	3DCH	RWr FC		RWw FC	2DCH	For station number 64
	3DDH	RWr FD		RWw FD	2DDH	
	3DEH	RWr FE		RWw FE	2DEH	
	3DFH	RWr FF		RWw FF	2DFH	

The following tables show the station numbers and corresponding buffer memory addresses.

[Master station]

Table of station numbers and corresponding buffer memory addresses

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	2E0H to 2E3H	14	314H to 317H	27	348H to 34BH	40	37CH to 37FH	53	3B0H to 3B3H
2	2E4H to 2E7H	15	318H to 31BH	28	34CH to 34FH	41	380H to 383H	54	3B4H to 3B7H
3	2E8H to 2EBH	16	31CH to 31FH	29	350H to 353H	42	384H to 387H	55	3B8H to 3BBH
4	2ECH to 2EFH	17	320H to 323H	30	354H to 357H	43	388H to 38BH	56	3BCH to 3BFH
5	2F0H to 2F3H	18	324H to 327H	31	358H to 35BH	44	38CH to 38FH	57	3C0H to 3C3H
6	2F4H to 2F7H	19	328H to 32BH	32	35CH to 35FH	45	390H to 393H	58	3C4H to 3C7H
7	2F8H to 2FBH	20	32CH to 32FH	33	360H to 363H	46	394H to 397H	59	3C8H to 3CBH
8	2FCH to 2FFH	21	330H to 333H	34	364H to 367H	47	398H to 39BH	60	3CCH to 3CFH
9	300H to 303H	22	334H to 337H	35	368H to 36BH	48	39CH to 39FH	61	3D0H to 3D3H
10	304H to 307H	23	338H to 33BH	36	36CH to 36FH	49	3A0H to 3A3H	62	3D4H to 3D7H
11	308H to 30BH	24	33CH to 33FH	37	370H to 373H	50	3A4H to 3A7H	63	3D8H to 3DBH
12	30CH to 30FH	25	340H to 343H	38	374H to 377H	51	3A8H to 3ABH	64	3DCH to 3DFH
13	310H to 313H	26	344H to 347H	39	378H to 37BH	52	3ACH to 3AFH	—	—

[Local station]

Table of station numbers and corresponding buffer memory addresses

Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address	Station number	Buffer memory address
1	1E0H to 1E3H	14	214H to 217H	27	248H to 24BH	40	27CH to 27FH	53	2B0H to 2B3H
2	1E4H to 1E7H	15	218H to 21BH	28	24CH to 24FH	41	280H to 283H	54	2B4H to 2B7H
3	1E8H to 1EBH	16	21CH to 21FH	29	250H to 253H	42	284H to 287H	55	2B8H to 2BBH
4	1ECH to 1EFH	17	220H to 223H	30	254H to 257H	43	288H to 28BH	56	2BCH to 2BFH
5	1F0H to 1F3H	18	224H to 227H	31	258H to 25BH	44	28CH to 28FH	57	2C0H to 2C3H
6	1F4H to 1F7H	19	228H to 22BH	32	25CH to 25FH	45	290H to 293H	58	2C4H to 2C7H
7	1F8H to 1FBH	20	22CH to 22FH	33	260H to 263H	46	294H to 297H	59	2C8H to 2CBH
8	1FCH to 1FFH	21	230H to 233H	34	264H to 267H	47	298H to 29BH	60	2CCH to 2CFH
9	200H to 203H	22	234H to 237H	35	268H to 26BH	48	29CH to 29FH	61	2D0H to 2D3H
10	204H to 207H	23	238H to 23BH	36	26CH to 26FH	49	2A0H to 2A3H	62	2D4H to 2D7H
11	208H to 20BH	24	23CH to 23FH	37	270H to 273H	50	2A4H to 2A7H	63	2D8H to 2DBH
12	20CH to 20FH	25	240H to 243H	38	274H to 277H	51	2A8H to 2ABH	64	2DCH to 2DFH
13	210H to 213H	26	244H to 247H	39	278H to 27BH	52	2ACH to 2AFH	—	—

(3) Link special relays (SB)

The link special relays store the data link status using bit ON/OFF data.
Buffer memory addresses 5E0H to 5FFH correspond to link special relays
SB0000 to SB01FF.
For details on the link special relays (SB0000 to SB01FF), refer to Section 17.3.3.
The following table shows the relationship between buffer memory addresses
5E0H to 5FFH and link special relays SB0000 to SB01FF.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
5E0H	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
5E1H	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10
5E2H	2F	2E	2D	2C	2B	2A	29	28	27	26	25	24	23	22	21	20
5E3H	3F	3E	3D	3C	3B	3A	39	38	37	36	35	34	33	32	31	30
5E4H	4F	4E	4D	4C	4B	4A	49	48	47	46	45	44	43	42	41	40
5E5H	5F	5E	5D	5C	5B	5A	59	58	57	56	55	54	53	52	51	50
5E6H	6F	6E	6D	6C	6B	6A	69	68	67	66	65	64	63	62	61	60
5E7H	7F	7E	7D	7C	7B	7A	79	78	77	76	75	74	73	72	71	70
5E8H	8F	8E	8D	8C	8B	8A	89	88	87	86	85	84	83	82	81	80
5E9H	9F	9E	9D	9C	9B	9A	99	98	97	96	95	94	93	92	91	90
5EAH	AF	AE	AD	AC	AB	AA	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
5EBH	BF	BE	BD	BC	BB	BA	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
5ECH	CF	CE	CD	CC	CB	CA	C9	C8	C7	C6	C5	C4	C3	C2	C1	C0
5EDH	DF	DE	DD	DC	DB	DA	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
5EEH	EF	EE	ED	EC	EB	EA	E9	E8	E7	E6	E5	E4	E3	E2	E1	E0
5EFH	FF	FE	FD	FC	FB	FA	F9	F8	F7	F6	F5	F4	F3	F2	F1	F0
5F0H	10F	10E	10D	10C	10B	10A	109	108	107	106	105	104	103	102	101	100
5F1H	11F	11E	11D	11C	11B	11A	119	118	117	116	115	114	113	112	111	110
5F2H	12F	12E	12D	12C	12B	12A	129	128	127	126	125	124	123	122	121	120
5F3H	13F	13E	13D	13C	13B	13A	139	138	137	136	135	134	133	132	131	130
5F4H	14F	14E	14D	14C	14B	14A	149	148	147	146	145	144	143	142	141	140
5F5H	15F	15E	15D	15C	15B	15A	159	158	157	156	155	154	153	152	151	150
5F6H	16F	16E	16D	16C	16B	16A	169	168	167	166	165	164	163	162	161	160
5F7H	17F	17E	17D	17C	17B	17A	179	178	177	176	175	174	173	172	171	170
5F8H	18F	18E	18D	18C	18B	18A	189	188	187	186	185	184	183	182	181	180
5F9H	19F	19E	19D	19C	19B	19A	199	198	197	196	195	194	193	192	191	190
5FAH	1AF	1AE	1AD	1AC	1AB	1AA	1A9	1A8	1A7	1A6	1A5	1A4	1A3	1A2	1A1	1A0
5FBH	1BF	1BE	1BD	1BC	1BB	1BA	1B9	1B8	1B7	1B6	1B5	1B4	1B3	1B2	1B1	1B0
5FCH	1CF	1CE	1CD	1CC	1CB	1CA	1C9	1C8	1C7	1C6	1C5	1C4	1C3	1C2	1C1	1C0
5FDH	1DF	1DE	1DD	1DC	1DB	1DA	1D9	1D8	1D7	1D6	1D5	1D4	1D3	1D2	1D1	1D0
5FEH	1EF	1EE	1ED	1EC	1EB	1EA	1E9	1E8	1E7	1E6	1E5	1E4	1E3	1E2	1E1	1E0
5FFH	1FF	1FE	1FD	1FC	1FB	1FA	1F9	1F8	1F7	1F6	1F5	1F4	1F3	1F2	1F1	1F0

(4) Link special registers (SW)
The link special registers store the data link status using word data.
Buffer memory addresses 600H to 7FFH correspond to link special registers SW0000 to SW01FF.
For more details on the link special registers (SW0000 to SW01FF), refer to Section 17.3.4.

(5) Slave station offset and size information
For the remote net ver.2 mode and the remote net additional mode, RX/RY/RWw/RWr assignment to station numbers varies depending on the expanded cyclic setting and the remote I/O station points setting.

(a) Offset
Head buffer memory addresses of RX/RY/RWw/RWr assigned to each station are stored.
When two or more stations are occupied, values are stored to the head buffer memory address of the station only. (When the station No. 1 occupies 2 stations, values are stored to RX/RY/RWw/RWr offset and size of station No. 1 only. RX/RY/RWw/RWr offset and size of station No. 2 are remained as default.)

(b) Size

Sizes of RX/RY/RWw/RWr assigned to each station are stored in word data.

When a size is less than 1 word, it is rounded up and 1 is stored. (When 8-point setting is set for I/O station points setting, 1 is stored.)

For the I/O station points setting, refer to Section 4.4.6.

For a reserved station, 0000H is stored.

| Buffer memory address | | Item | Default (Hexadecimal) |
Hexadecimal	Decimal		
3E0H	992	Station No. 1 RX offset	0000H
3E1H	993	Station No. 1 RX size	0000H
to	to	to	——
45EH	1118	Station No. 64 RX offset	0000H
45FH	1119	Station No. 64 RX size	0000H
460H	1120	Station No. 1 RY offset	0000H
461H	1121	Station No. 1 RY size	0000H
to	to	to	——
4DEH	1246	Station No. 64 RY offset	0000H
4DFH	1247	Station No. 64 RY size	0000H
4E0H	1248	Station No. 1 RWw offset	0000H
4E1H	1249	Station No. 1 RWw size	0000H
to	to	to	——
55EH	1374	Station No. 64 RWw offset	0000H
55FH	1375	Station No. 64 RWw size	0000H
560H	1376	Station No. 1 RWr offset	0000H
561H	1377	Station No. 1 RWr size	0000H
to	to	to	——
5DEH	1502	Station No. 64 RWr offset	0000H
5DFH	1503	Station No. 64 RWr size	0000H

(Example) When a local station with the expanded cyclic setting and a
remote I/O station with the points setting are connected.
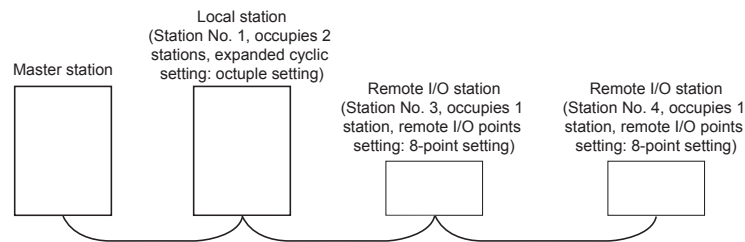
Buffer memory	Value	Description
Station No. 1 RX offset	4000H	Head buffer memory address of station No. 1 RX
Station No. 1 RX size	24 (18H)	384 (points of RX) / 16 = 24 words
Station No. 2 RX offset	4000H	Checks the station No. 1 area because it occupies 2 stations.
Station No. 2 RX size	0 (Default)	Checks the station No. 1 area because it occupies 2 stations.
Station No. 3 RX offset	4018H	Head buffer memory address of station No. 3 RX
Station No. 3 RX size	1 (1H)	The lower 8 bits of buffer memory address 4018H is the corresponding size for station No. 3 RX, however, because a value less than one word is rounded up, 1 is stored.
Station No. 4 RX offset	4018H	Head buffer memory address of station No. 4 RX
Station No. 4 RX size	1 (1H)	The higher 8 bits of buffer memory address 4018H is the corresponding size for station No. 4 RX, however, because a value less than one word is rounded up, 1 is stored.
Station No. 1 RY offset	4200H	Head buffer memory address of station No. 1 RY
Station No. 1 RY size	24 (18H)	384 (points of RY) / 16 = 24 words
Station No. 2 RY offset	4200H	Checks the station No. 1 area because it occupies 2 stations.
Station No. 2 RY size	0 (Default)	Checks the station No. 1 area because it occupies 2 stations.
Station No. 3 RY offset	4218H	Head buffer memory address of station No. 3 RY
Station No. 3 RY size	1 (1H)	The lower 8 bits of buffer memory address 4018H is the corresponding size for station No. 3 RY, however, because a value less than one word is rounded up, 1 is stored.
Station No. 4 RY offset	4218H	Head buffer memory address of station No. 4 RY
Station No. 4 RY size	1 (18H)	The higher 8 bits of buffer memory address 4018H is the corresponding size for station No. 4 RY, however, because a value less than one word is rounded up, 1 is stored.
Station No. 1 RWw offset	4400H	Head buffer memory address of station No. 1 RWw
Station No. 1 RWw size	64 (40H)	2 (number of occupied stations) x 32 (expanded cyclic setting) = 64
Station No. 2 RWw offset	4400H	Checks the station No. 1 area because it occupies 2 stations.
Station No. 2 RWw size	0 (Default)	Checks the station No. 1 area because it occupies 2 stations.
Station No. 3 RWw offset	4440H	Head buffer memory address of station No. 3 RWw
Station No. 3 RWw size	0 (Default)	Buffer memory size of station No. 3 RWw
Station No. 4 RWw offset	4440H	Head buffer memory address of station No. 4 RWw
Station No. 4 RWw size	0 (Default)	Buffer memory size of station No. 4 RWw
Station No. 1 RWr offset	4C00H	Head buffer memory address of station No. 1 RWr
Station No. 1 RWr size	64 (40H)	2 (number of occupied stations) x 32 (expanded cyclic setting) = 64
Station No. 2 RWr offset	4C00H	Checks the station No. 1 area because it occupies 2 stations.
Station No. 2 RWr size	0 (Default)	Checks the station No. 1 area because it occupies 2 stations.
Station No. 3 RWr offset	4C40H	Head buffer memory address of station No. 3 RWr
Station No. 3 RWr size	0 (Default)	Buffer memory size of station No. 3 RWr
Station No. 4 RWr offset	4C40H	Head buffer memory address of station No. 4 RWr
Station No. 4 RWr size	0 (Default)	Buffer memory size of station No. 4 RWr

(6) Random access buffer

The random access buffer stores any data to be sent to other stations.

The reading and writing of data are performed using transient transmission.

(7) Automatic update buffer

The automatic update buffer stores automatic update data when performing transient transmission (communication using the automatic update buffer) with the AJ65BT-R2.

Set the automatic update buffer size for the AJ65BT-R2 in the Parameter settings of the CC-Link Ver.2 Utility.

For more details on the automatic update buffer size settings, refer to Section 6.1.

[Communication example using the automatic update buffer]
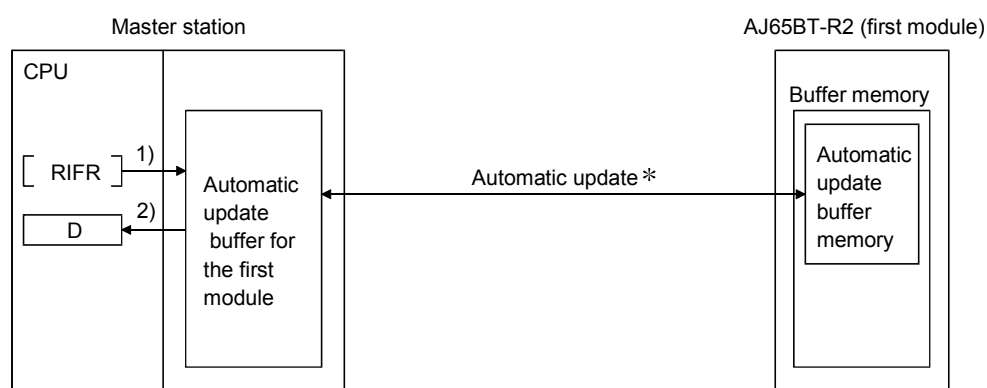
1) Data are written to the automatic update buffer of the 1st module.

2) The automatic update buffer data are transferred between the AJ65BT-R2 and CC-Link Ver.2 board by the link scan.

3) The data is read from the automatic update buffer for the 1st module.

✻: For details on the automatic update timing, refer to AJ65BT-R2 Type RS-232C Interface Module User's Manual.

(8) Ver.2 compatible remote input (RX) and Ver.2 compatible remote output (RY)

When the remote net ver.2 mode or remote net additional mode is selected, the number of points indicated below is used.

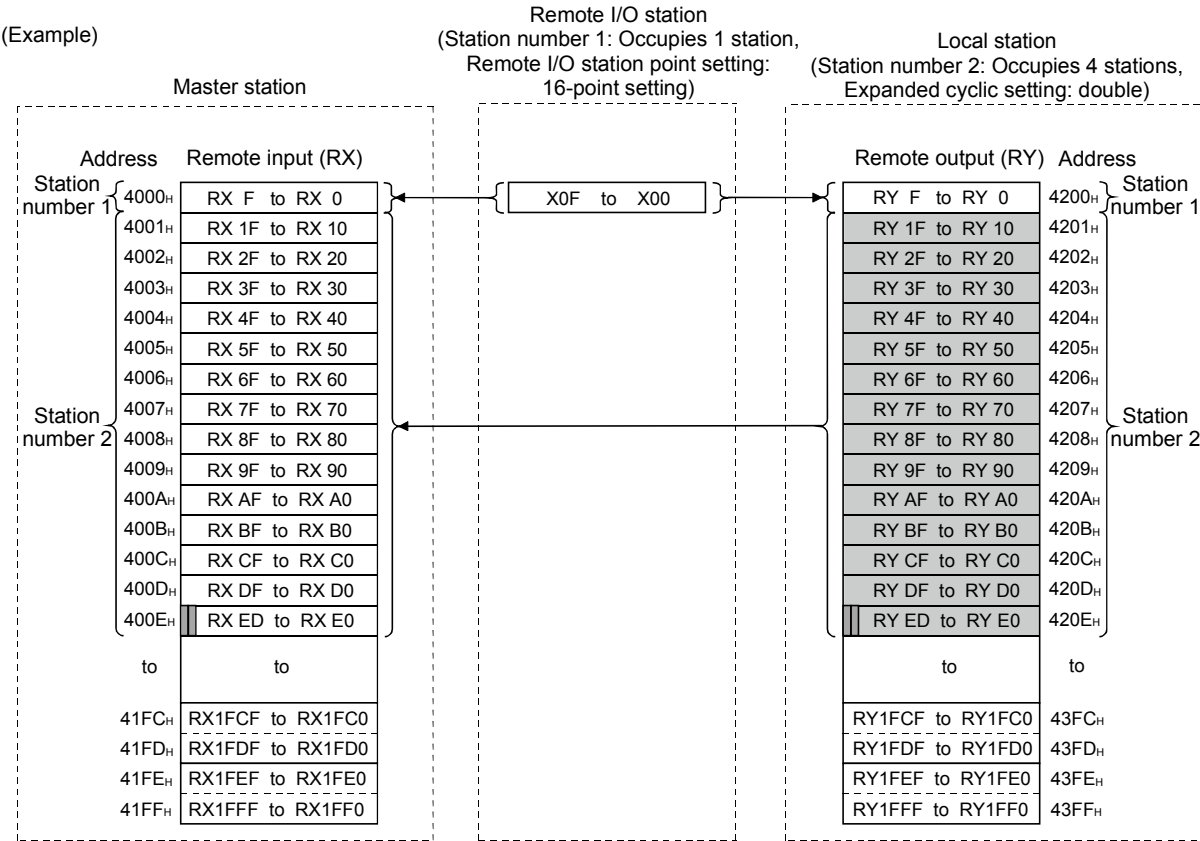(a) Master station ← remote I/O station/remote device station/local station

1) Master station
  - The input status from the remote I/O station, remote device station (RX) and local station (RY) is stored.
  - When 1 station is occupied, 2, 4 or 8 words (32, 64 or 128 points) are used. The number of used points changes depending on the expanded cyclic setting and the occupied station count. (refer to Section 3.2)

2) Local station
  - Data to be sent to the master station is stored in the remote output (RY) of the address corresponding to the host station number.
  - The input status from the remote I/O station, remote device station (RX) and other local station is stored.
  - When 1 station is occupied, 2, 4 or 8 words (32, 64 or 128 points) are used. The number of used points changes depending on the expanded cyclic setting and the occupied station count. (refer to Section 3.2)

▌ … The last two bits cannot be used for communication between the master station and the local station.
(In the example below, RYEE and RYEF cannot be used.)

(Example)

Remote I/O station
(Station number 1: Occupies 1 station,
Remote I/O station point setting:
16-point setting)

Local station
(Station number 2: Occupies 4 stations,
Expanded cyclic setting: double)

Master station

	Address	Remote input (RX)		X0F to X00		Remote output (RY)	Address	
Station number 1	4000H	RX F to RX 0	←		→	RY F to RY 0	4200H	Station number 1
	4001H	RX 1F to RX 10				RY 1F to RY 10	4201H	
	4002H	RX 2F to RX 20				RY 2F to RY 20	4202H	
	4003H	RX 3F to RX 30				RY 3F to RY 30	4203H	
	4004H	RX 4F to RX 40				RY 4F to RY 40	4204H	
	4005H	RX 5F to RX 50				RY 5F to RY 50	4205H	
	4006H	RX 6F to RX 60				RY 6F to RY 60	4206H	
Station number 2	4007H	RX 7F to RX 70	←			RY 7F to RY 70	4207H	Station number 2
	4008H	RX 8F to RX 80				RY 8F to RY 80	4208H	
	4009H	RX 9F to RX 90				RY 9F to RY 90	4209H	
	400AH	RX AF to RX A0				RY AF to RY A0	420AH	
	400BH	RX BF to RX B0				RY BF to RY B0	420BH	
	400CH	RX CF to RX C0				RY CF to RY C0	420CH	
	400DH	RX DF to RX D0				RY DF to RY D0	420DH	
	400EH	▌RX ED to RX E0				▌RY ED to RY E0	420EH	
	to	to				to	to	
	41FCH	RX1FCF to RX1FC0				RY1FCF to RY1FC0	43FCH	
	41FDH	RX1FDF to RX1FD0				RY1FDF to RY1FD0	43FDH	
	41FEH	RX1FEF to RX1FE0				RY1FEF to RY1FE0	43FEH	
	41FFH	RX1FFF to RX1FF0				RY1FFF to RY1FF0	43FFH	

(b) Master station → remote I/O station/remote device station/local station
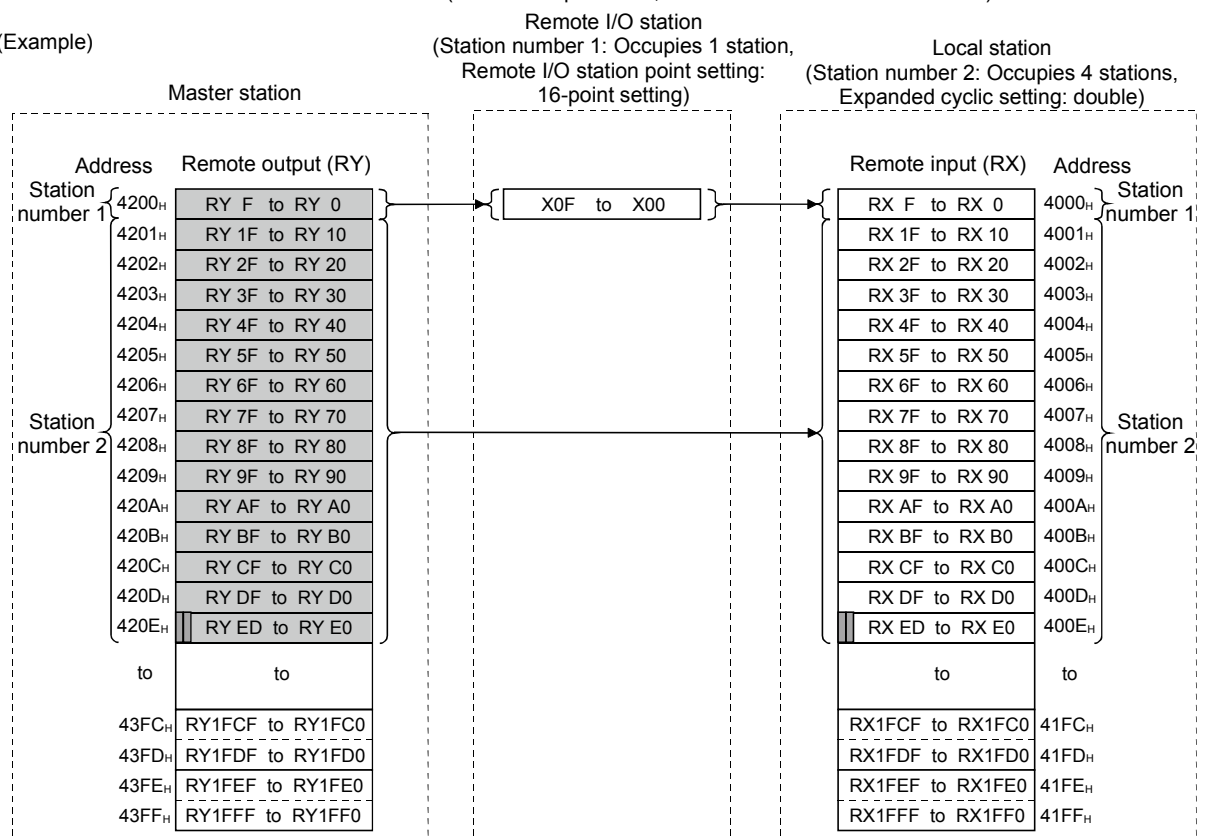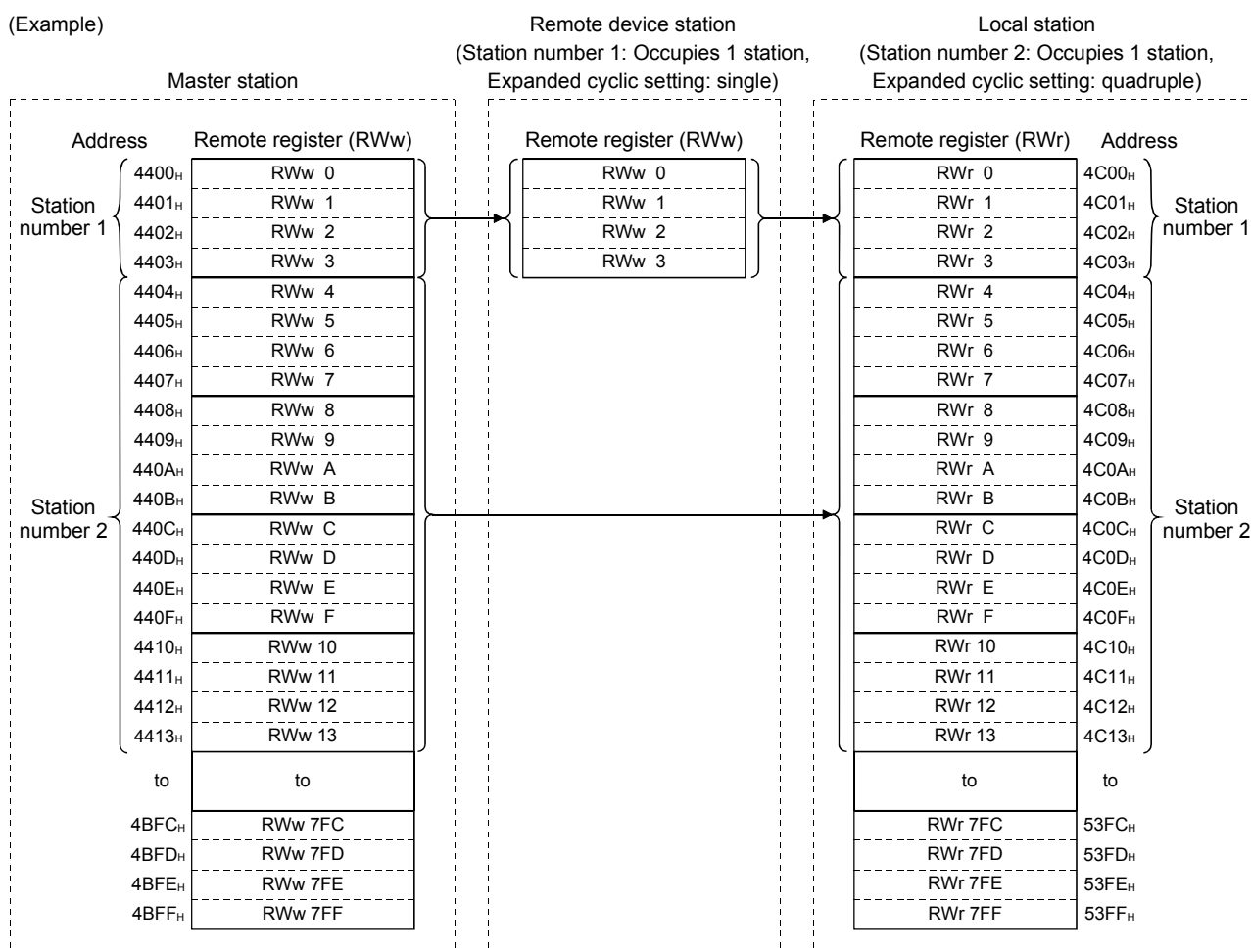
1) Master station

- The output status to the remote I/O station, remote device station (RY) and all local stations (RX) is stored.
- When 1 station is occupied, 2, 4 or 8 words (32, 64 or 128 points) are used. The number of used points changes depending on the expanded cyclic setting and the occupied station count. (refer to Section 3.2)

2) Local station

- The data received from the remote I/O station, remote device station (RY) and master station (RY) is stored.
- When 1 station is occupied, 2, 4 or 8 words (32, 64 or 128 points) are used. The number of used points changes depending on the expanded cyclic setting and the occupied station count. (refer to Section 3.2)

▌ … The last two bits cannot be used for communication between the master station and the local station.
(In the example below, RYEE and RYEF cannot be used.)

(Example)

Remote I/O station
(Station number 1: Occupies 1 station,
Remote I/O station point setting:
16-point setting)

Local station
(Station number 2: Occupies 4 stations,
Expanded cyclic setting: double)

Master station

Address	Remote output (RY)				Remote input (RX)	Address	
Station number 1 {4200H	RY F to RY 0		X0F to X00		RX F to RX 0	4000H	} Station number 1
4201H	RY 1F to RY 10				RX 1F to RX 10	4001H	
4202H	RY 2F to RY 20				RX 2F to RX 20	4002H	
4203H	RY 3F to RY 30				RX 3F to RX 30	4003H	
4204H	RY 4F to RY 40				RX 4F to RX 40	4004H	
4205H	RY 5F to RY 50				RX 5F to RX 50	4005H	
4206H	RY 6F to RY 60				RX 6F to RX 60	4006H	
Station number 2 4207H	RY 7F to RY 70				RX 7F to RX 70	4007H	Station number 2
4208H	RY 8F to RY 80				RX 8F to RX 80	4008H	
4209H	RY 9F to RY 90				RX 9F to RX 90	4009H	
420AH	RY AF to RY A0				RX AF to RX A0	400AH	
420BH	RY BF to RY B0				RX BF to RX B0	400BH	
420CH	RY CF to RY C0				RX CF to RX C0	400CH	
420DH	RY DF to RY D0				RX DF to RX D0	400DH	
420EH	▌ RY ED to RY E0				▌ RX ED to RX E0	400EH	
to	to				to	to	
43FCH	RY1FCF to RY1FC0				RX1FCF to RX1FC0	41FCH	
43FDH	RY1FDF to RY1FD0				RX1FDF to RX1FD0	41FDH	
43FEH	RY1FEF to RY1FE0				RX1FEF to RX1FE0	41FEH	
43FFH	RY1FFF to RY1FF0				RX1FFF to RX1FF0	41FFH	

(9) Ver.2 compatible remote registers (RWw) and (RWr)

When the remote net ver.2 mode or remote net additional mode is selected, the number of words indicated below is used.

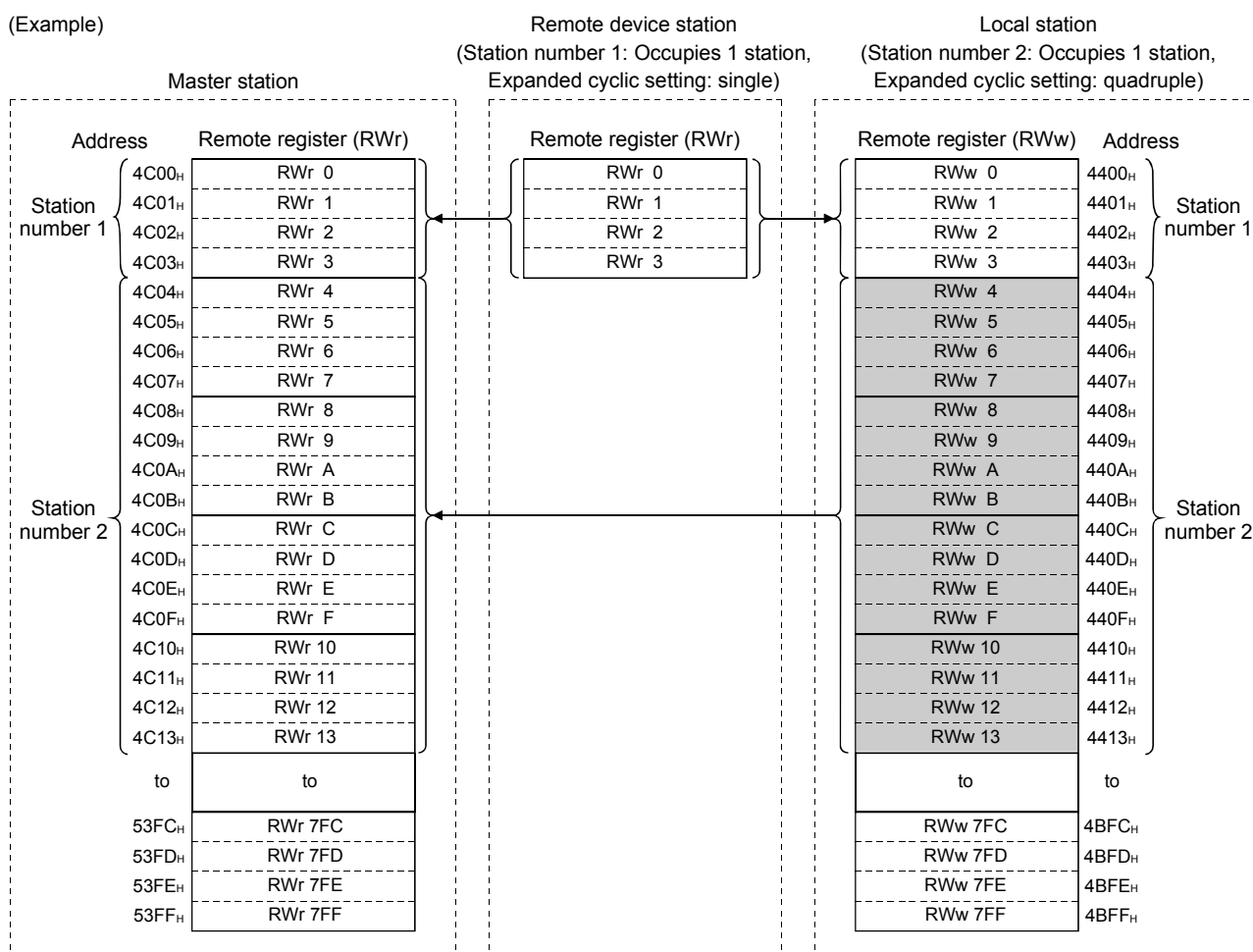(a) Master station (RWw) → remote device station (RWw)/local station (RWr)

1) Master station

- The data to be sent to the remote register (RWw) of the remote device station and the remote registers (RWr) of all local stations are stored.
- When 1 station is occupied, any of 4 to 32 words are used. The number of used points changes depending on the expanded cyclic setting and the occupied station count. (refer to Section 3.2)

2) Local station

- The data sent to the remote register (RWw) of the remote device station can also be received.
- When 1 station is occupied, any of 4 to 32 words are used. The number of used points changes depending on the expanded cyclic setting and the occupied station count. (refer to Section 3.2)

(Example)

Remote device station
(Station number 1: Occupies 1 station,
Expanded cyclic setting: single)

Local station
(Station number 2: Occupies 1 station,
Expanded cyclic setting: quadruple)

Master station

Address	Remote register (RWw)		Remote register (RWw)		Remote register (RWr)	Address	
4400H	RWw 0		RWw 0		RWr 0	4C00H	
4401H	RWw 1		RWw 1		RWr 1	4C01H	
4402H	RWw 2		RWw 2		RWr 2	4C02H	
4403H	RWw 3		RWw 3		RWr 3	4C03H	
4404H	RWw 4				RWr 4	4C04H	
4405H	RWw 5				RWr 5	4C05H	
4406H	RWw 6				RWr 6	4C06H	
4407H	RWw 7				RWr 7	4C07H	
4408H	RWw 8				RWr 8	4C08H	
4409H	RWw 9				RWr 9	4C09H	
440AH	RWw A				RWr A	4C0AH	
440BH	RWw B				RWr B	4C0BH	
440CH	RWw C				RWr C	4C0CH	
440DH	RWw D				RWr D	4C0DH	
440EH	RWw E				RWr E	4C0EH	
440FH	RWw F				RWr F	4C0FH	
4410H	RWw 10				RWr 10	4C10H	
4411H	RWw 11				RWr 11	4C11H	
4412H	RWw 12				RWr 12	4C12H	
4413H	RWw 13				RWr 13	4C13H	
to	to				to	to	
4BFCH	RWw 7FC				RWr 7FC	53FCH	
4BFDH	RWw 7FD				RWr 7FD	53FDH	
4BFEH	RWw 7FE				RWr 7FE	53FEH	
4BFFH	RWw 7FF				RWr 7FF	53FFH	

Station number 1 (addresses 4400H–4403H, Master station)
Station number 2 (addresses 4404H–4413H, Master station)
Station number 1 (addresses 4C00H–4C03H, Local station)
Station number 2 (addresses 4C04H–4C13H, Local station)

(b) Master station (RWr) ← remote device station (RWr)/local station (RWw)

1) Master station
- The send data from the remote register (RWr) of the remote device station and the remote register (RWw) of the local station is stored.
- When 1 station is occupied, any of 4 to 32 words are used. The number of used points changes depending on the expanded cyclic setting and the occupied station count. (refer to Section 3.2)

2) Local station
- Data is sent to the master station and other local stations by storing it in the address corresponding to the host station number.
- Data in the remote register (RWr) of the remote device station can also be received.
- When 1 station is occupied, any of 4 to 32 words are used. The number of used points changes depending on the expanded cyclic setting and the occupied station count. (refer to Section 3.2)

(Example)

Remote device station
(Station number 1: Occupies 1 station,
Expanded cyclic setting: single)

Local station
(Station number 2: Occupies 1 station,
Expanded cyclic setting: quadruple)

Master station					Remote device station		Local station		
Address	Remote register (RWr)				Remote register (RWr)		Remote register (RWw)	Address	
Station number 1	4C00H	RWr 0			RWr 0		RWw 0	4400H	Station number 1
	4C01H	RWr 1			RWr 1		RWw 1	4401H	
	4C02H	RWr 2			RWr 2		RWw 2	4402H	
	4C03H	RWr 3			RWr 3		RWw 3	4403H	
	4C04H	RWr 4					RWw 4	4404H	
	4C05H	RWr 5					RWw 5	4405H	
	4C06H	RWr 6					RWw 6	4406H	
	4C07H	RWr 7					RWw 7	4407H	
	4C08H	RWr 8					RWw 8	4408H	
	4C09H	RWr 9					RWw 9	4409H	
	4C0AH	RWr A					RWw A	440AH	
	4C0BH	RWr B					RWw B	440BH	
Station number 2	4C0CH	RWr C					RWw C	440CH	Station number 2
	4C0DH	RWr D					RWw D	440DH	
	4C0EH	RWr E					RWw E	440EH	
	4C0FH	RWr F					RWw F	440FH	
	4C10H	RWr 10					RWw 10	4410H	
	4C11H	RWr 11					RWw 11	4411H	
	4C12H	RWr 12					RWw 12	4412H	
	4C13H	RWr 13					RWw 13	4413H	
	to	to					to	to	
	53FCH	RWr 7FC					RWw 7FC	4BFCH	
	53FDH	RWr 7FD					RWw 7FD	4BFDH	
	53FEH	RWr 7FE					RWw 7FE	4BFEH	
	53FFH	RWr 7FF					RWw 7FF	4BFFH	

Appendix 5 Mode Selection Method

Three different modes are available for CC-Link system to be applicable to various systems.
The following flowchart explains the points of mode selection.
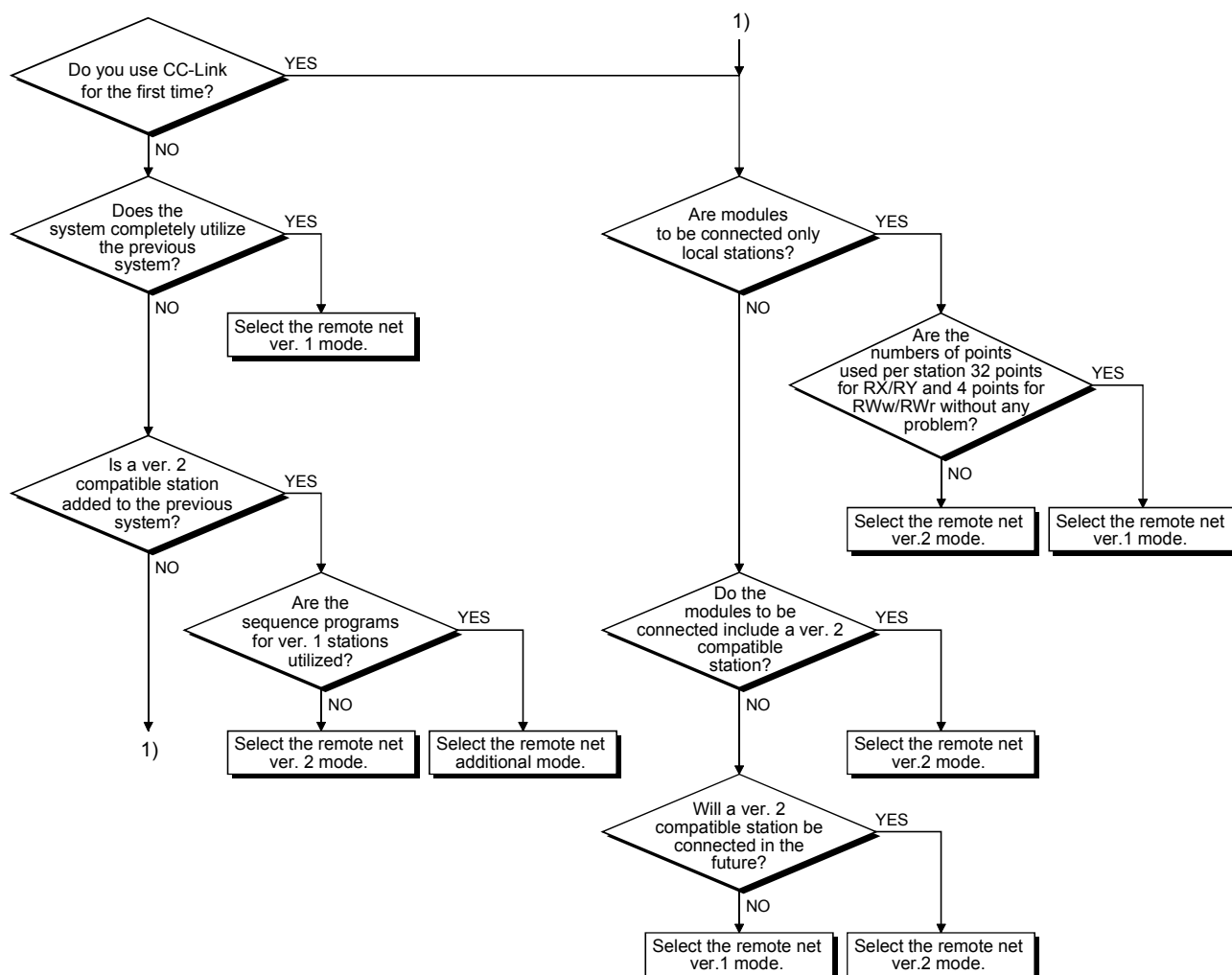
Appendix 6 Communication with the Redundant CPU

This section explains communication with the Redundant CPU when the CC-Link Ver.2 board is used.

(1) Incorporation into redundant system
In a Redundant CPU system, be sure to set the CC-Link Ver.2 board to a local station.
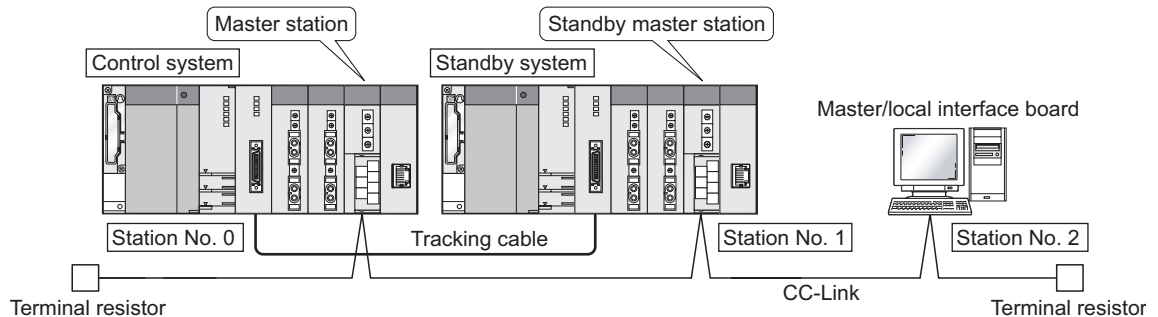
(2) Access to the Redundant CPU
(a) Redundant CPU specify
To access the Redundant CPU, directly specify the station number of the CC-Link module mounted on the station of the target Redundant CPU.

(b) Action to be taken at occurrence of system switching
After system switching, the Redundant CPU in the same system (control system or standby system) can also be accessed by directly specifying the station number that was specified before system switching. [1]

*1: When system switching occurs in the Redundant CPU system to be accessed, the station number of the CC-Link module mounted on the station of each Redundant CPU is also changed internally.

(Example) When the Redundant CPU in the control system is accessed
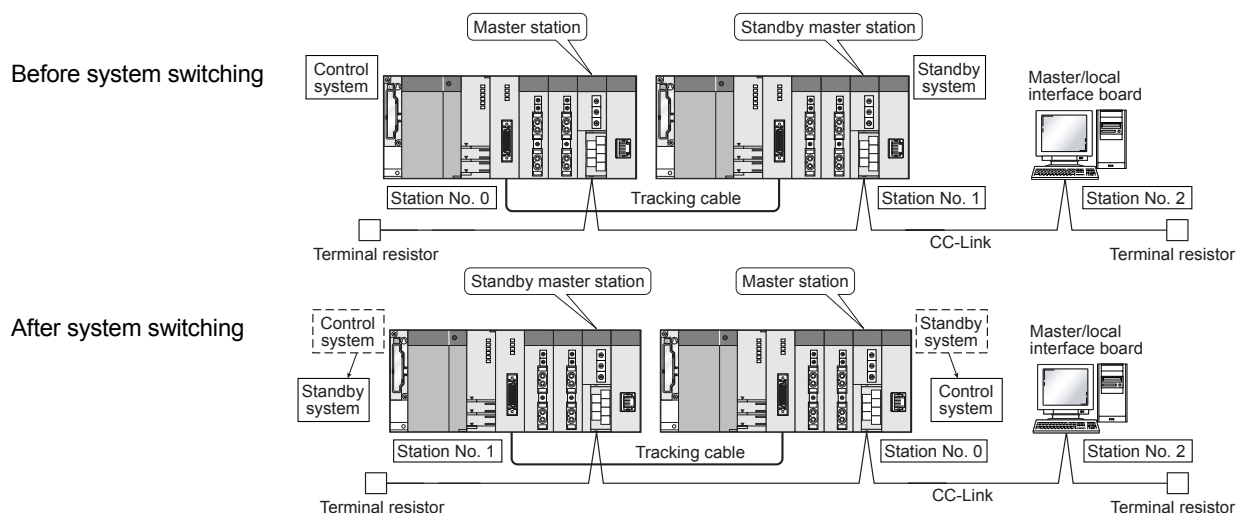
POINT					
Create a program to monitor which system in the redundant CPU system is accessed from the CC-Link Ver.2 board.					

SM 1515	Control system judgment flag	• Indicates the CPU module operation status • Remains ON/OFF even if the tracking cable is disconnected while the redundant system is running.			
SM 1516	Standby system judgment flag		Control system	Standby system	At the time of TRK.CABLE ERR.(Error code: 6120) occurrence (System not determined.)
		SM1515	ON	OFF	OFF
		SM1516	OFF	ON	OFF

(3) Retry processing for error that will occur during system switching processing

Any of the following errors will occur when the MELSEC data link library is used to access the Redundant CPU during system switching processing.

Examples of errors that will occur in redundant CPU
- A system switching error   (Error code 4248$_H$)
- CPU starting error   (Error code 4004$_H$)
- Other system CPU module error   (Error code 4245$_H$)
- Access destination illegal error (Error code FFDF$_H$)

Examples of errors that will occur in CC-Link Ver.2 board or module
- Response timeout   (Error code B778h)
- Corresponding station error during sending   (Error code B201h)
- Transient target station error   (Error code B205h)

When an error has occurred, confirm the error code, and create a user program for retry processing as necessary.

(a) The following indicates the functions that will result in error if executed during system switching.

	Functions that will result in error by system switching
MELSEC data link library	mdControl,mdDevRst,mdDevSet,mdRandR,mdRandW, mdReceive,mdSend,mdTypeRead

(b) The following example gives a flowchart for error occurrence at batch write.

```
                    ┌─────────────┐
                    │    START    │
                    └──────┬──────┘
                           │                                        ┌──────────────────────┐
                    ┌──────▼──────────┐                             │                      │
                    │ Write processing│                             │                      │
                    │(mdSend          │                             │                      │
                    │ instruction),etc│                             │                      │
                    └──────┬──────────┘                             │                      │
                           │              YES                       │                      │
                    ◇──────────────────────┐                       │                      │
              Has error occurred?          │                       │                      │
                    ◇                       │                       │                      │
                    │ NO                    ▼                       │                      │
                    │              ┌─────────────────┐              │                      │
                    │              │Error code is    │              │                      │
                    │              │checked. *1      │              │                      │
                    │              └────────┬────────┘              │                      │
                    │                       │                       │                      │
                    │                  ◇─────────────── YES  Retry processing             │
                    │            Does the error                     │                      │
                    │            require retry                      │                      │
                    │            processing?                        │                      │
                    │                  ◇                            │                      │
                    │                  │ NO                         ▼                      │
           ┌────────▼────────┐ ┌───────▼─────────┐        ┌──────────────────┐            │
           │Normal processing│ │Error handling is│        │ Wait processing  │────────────┘
           │is executed.     │ │executed. *2     │        │ is executed.     │
           └────────┬────────┘ └───────┬─────────┘        └──────────────────┘
                    │                  │
                    ▼◄─────────────────┘
             ┌──────────┐
             │   END    │
             └──────────┘
```
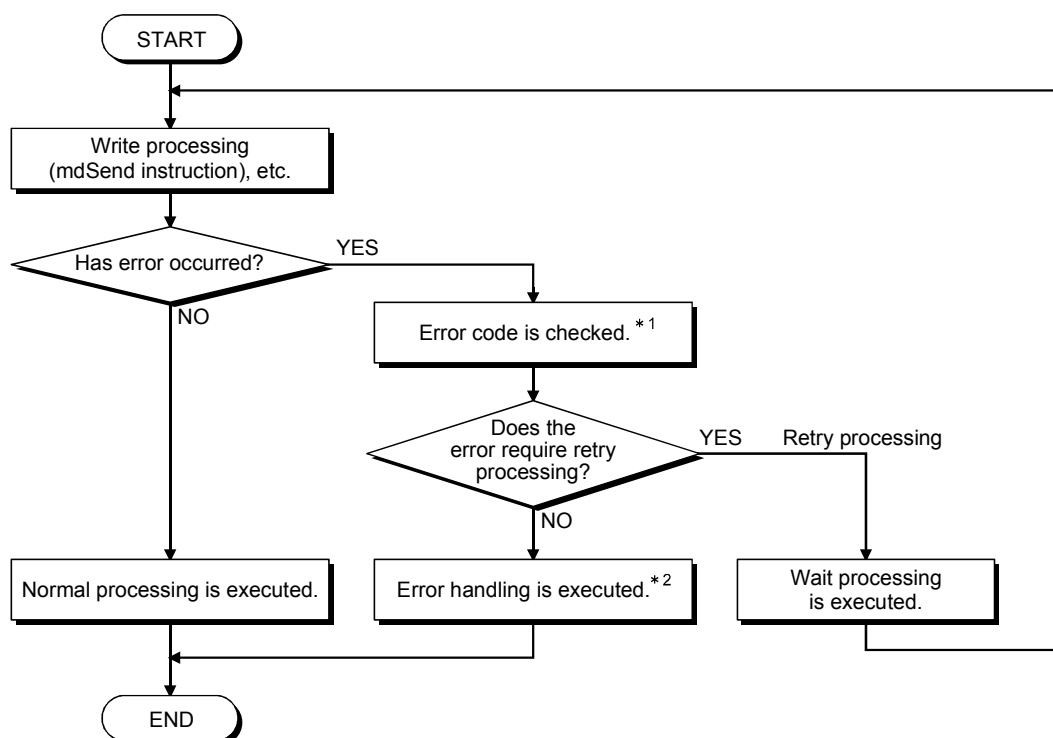
*1: Refer to the following manual for the details of and corrective action for the error code.

When a Redundant CPU error occurs
- "Error code returned to request source during communication with CPU module" in the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

When a CC-Link Ver.2 board error or module error occurs
- Section 17.3.5 in this manual
  "Error codes stored in the link special registers"

*2: Perform retry processing as necessary according to the system specifications.

Appendix 7 Warning Message Appears on Windows®

Appendix 7.1 Overview of warning message

As a user account control function has been added to Windows Vista® , Windows Server® 2008 and Windows® 7, a warning message appears when you run the CC-Link Ver.2 utility or the Device monitor utility.
(Refer to Section 9.1)

        <Using Windows Vista® /Windows® 2008>   <Using Windows® 7>
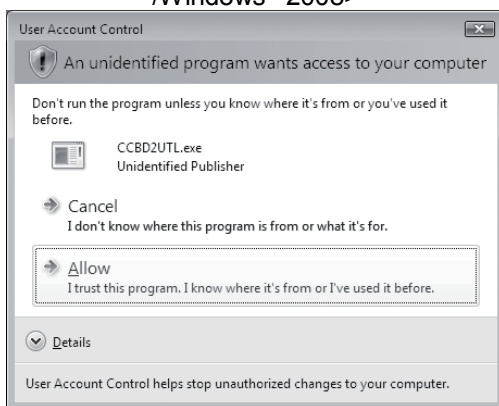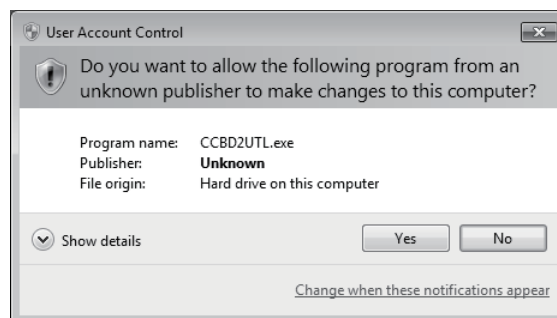
Appendix 7.2 Methods for preventing the warning message

POINT
The user account control (UAC) function prevents a crash (e.g. prevention of start-up of a program which executes unintended operation). Before setting this function, grasp that the security function offered by UAC will be disabled and fully understand the risk.

The following two methods are available for preventing a warning message.

(1) Disabling the user account control function
    The following shows a procedure for disabling the user account control function.

(a) Using Windows Vista® /Windows® 2008

1) Select [Start] – [Control Panel].
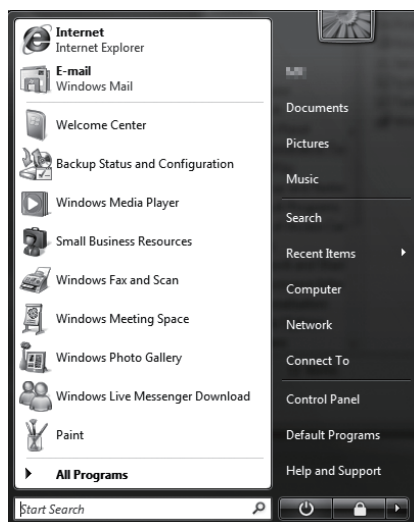
2) Select [User Accounts].

↓
(To next page)
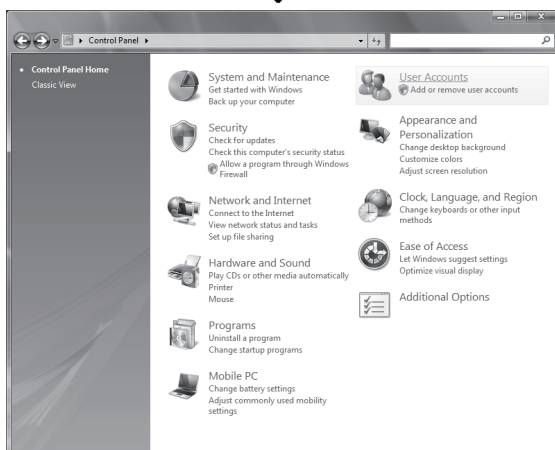
(From preceding page)
↓
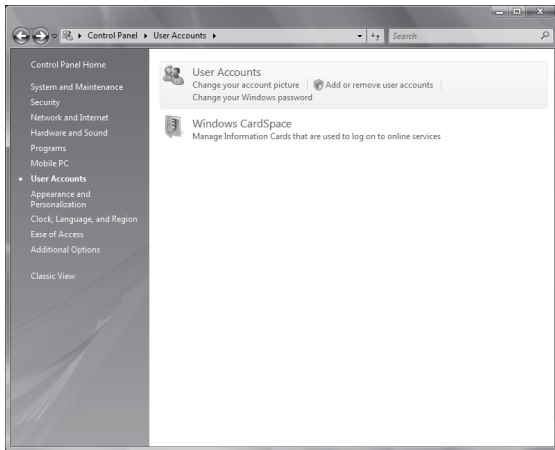
3) Select [User Accounts].

↓
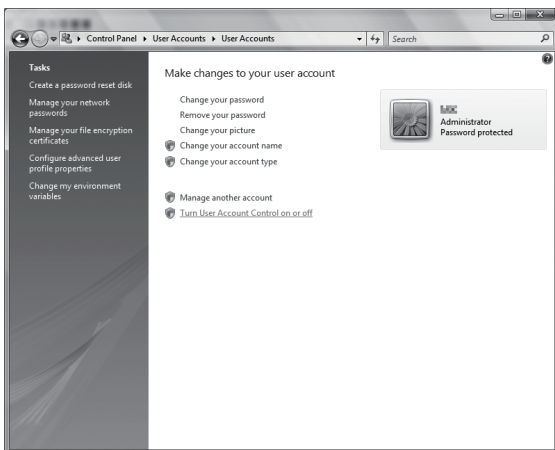
4) Select [Turn User Account Control on or off].

↓
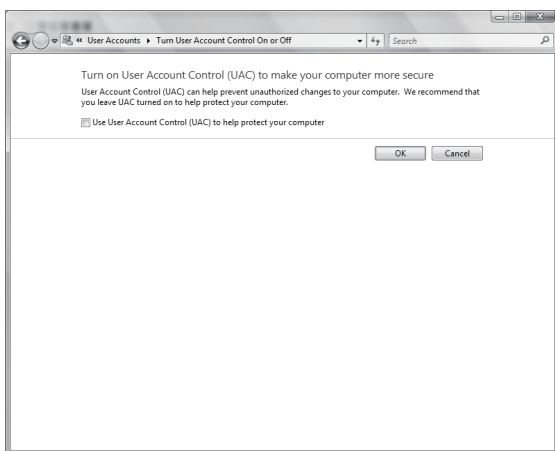
5) Deselect [Turn on User Account Control (UAC) to make your computer more secure] and click the [OK] button.

↓
(Setting completion)

(b) Using Windows® 7

1) Select [Start] – [Control Panel].
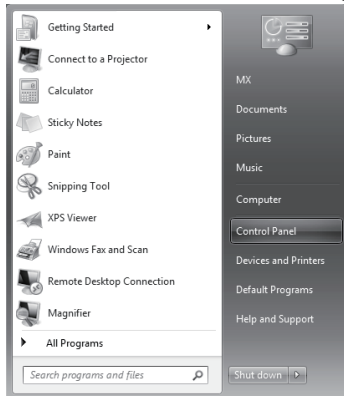
2) Select [System and Security].
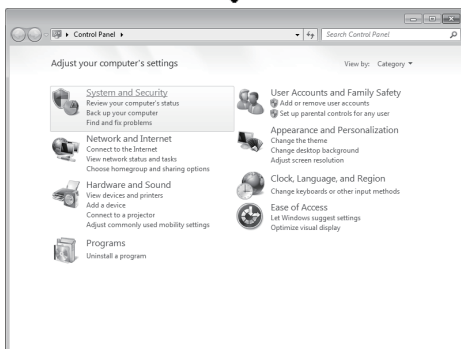
3) Select [Change User Account Control settings].
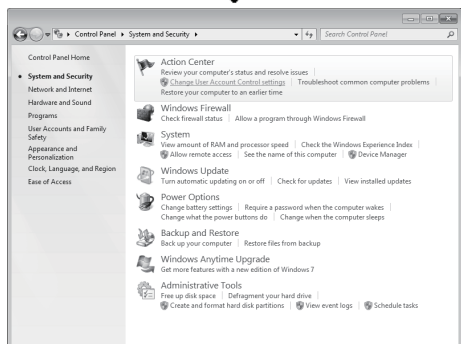
4) Set the slide bar [Never notify me when] and click the
   OK button.
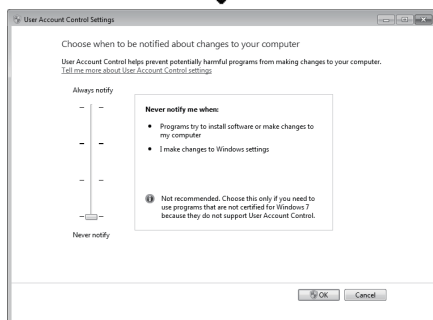
(Setting completion)

(2) Allowing the warning message without showing it
The following shows a procedure for allowing a warning message without showing it.
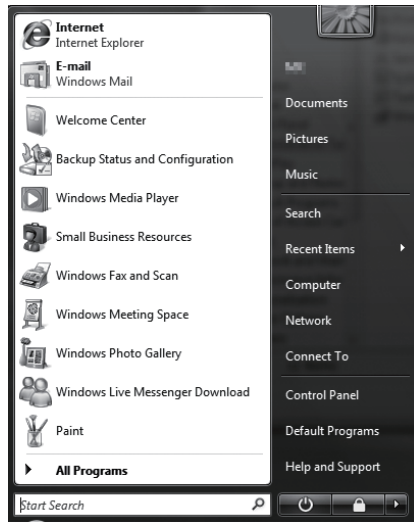
1) Select [Start] – [Control Panel].
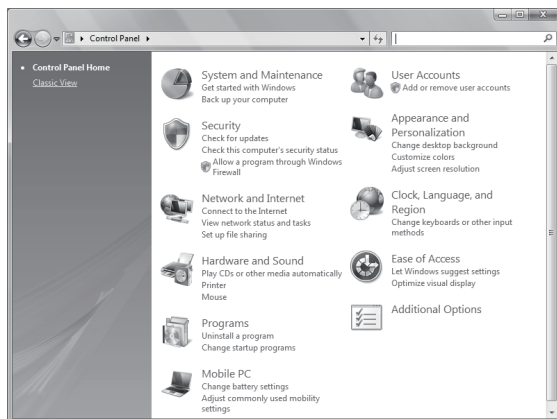
2) Select [Classic View].
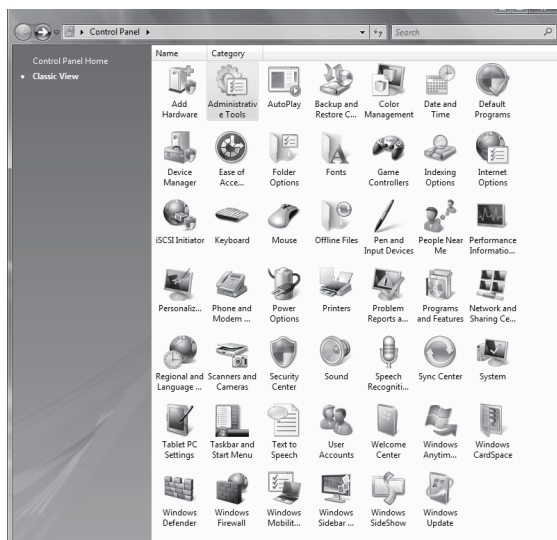
3) Select [Administrative Tools].

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(To next page)

(From preceding page)
↓

↓

↓
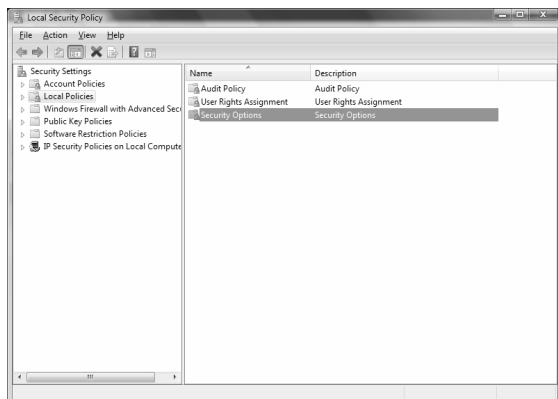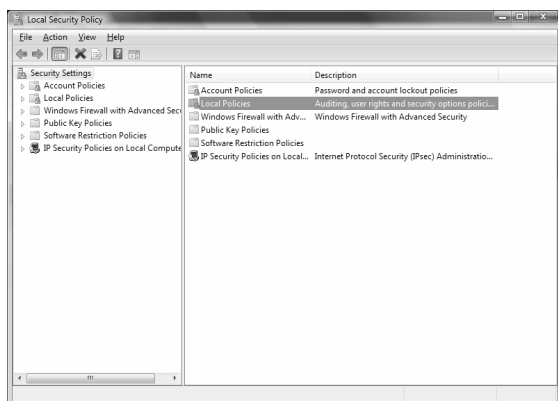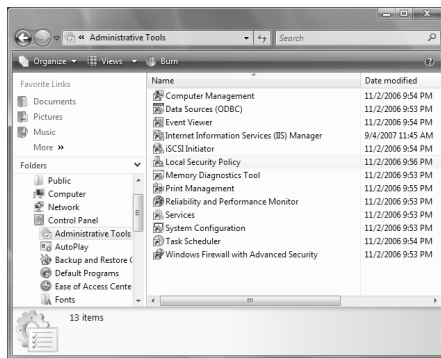
↓
(To next page)

4) Select [Local Security Policy].

  * When user account control is enabled in Windows Vista® , the following screen appears. Click the Continue or Yes button.

< Windows Vista®
/Windows Server® 2008>   < Windows® 7>
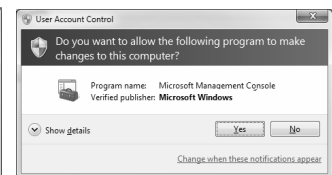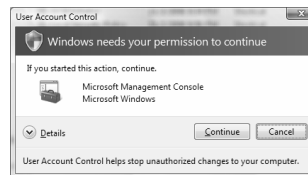
5) Select [Local Policies].

6) Select [Security Options].

(From preceding page)

↓
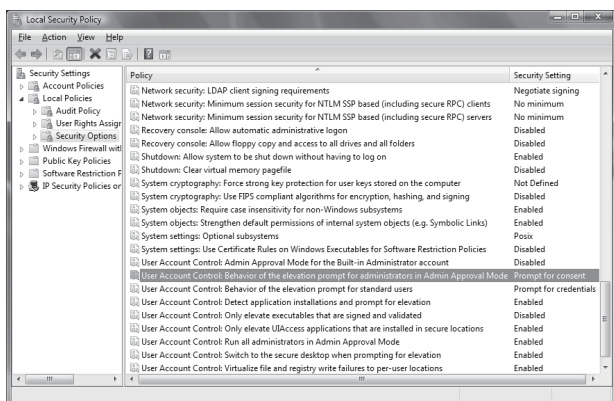
7) Select [User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode Prompt for consent].

↓
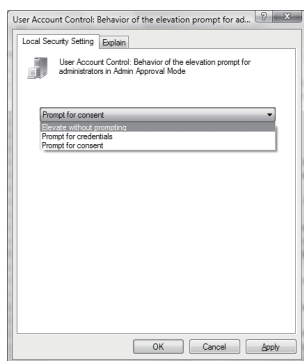
8) Select [Elevate without prompting] on the <<Local Security Setting>> tab, and click the OK button.

↓

(Setting completion)

Appendix 8 Combinations of Boards with Existing Software

This section describes the combinations of boards with existing software.

(1) When using the CC-Link Ver.2 board(Q80BD-J61BT11N) and other interface boards in the same PC

Board model name	Software package name	SW1DNC-CCBD2-B							
		Supported OS							
		NT 4.0	Win 2000	XP Pro	XP Home	Server 2003	Vista	Server 2008	Win 7
Q80BD-J71LP21-25	SW0DNC-MNETH	○	○	×	×	×	×	×	×
Q80BD-J71LP21-25 Q80BD-J71BR11 Q80BD-J71LP21G Q80BD-J71LP21GE	SW0DNC-MNETH-B	○	○	△ (70H)	×	○	△ (17T)	△ (21X)	△ (21X)
Q81BD-J71LP21-25		×	○	△ (70H)	×	○	△ (17T)	△ (21X)	△ (21X)
A70BDE-J71QLP23 A70BDE-J71QLP23GE A70BDE-J71QBR13	SW0IVDWT-MNET10P	×	×	×	×	×	×	×	×
	SW1IVDWT-MNET10P	○ ＊1	×	×	×	×	×	×	×
	SW2DNF-MNET10	○	×	×	×	×	×	×	×
	SW3DNF-MNET10	○	×	×	×	×	×	×	×
A70BDE-J71QLR23	SW3DNF-MNET10	○	×	×	×	×	×	×	×
A80BDE-J61BT11 A80BDE-J61BT13	SW2DNF-CCLINK	×	×	×	×	×	×	×	×
	SW3DNF-CCLINK	×	×	×	×	×	×	×	×
	SW4DNF-CCLINK	×	×	×	×	×	×	×	×
	SW4DNF-CCLINK-B	×	×	×	×	×	×	×	×
A80BDE-A2USH-S1	SW0DNF-ANU	○	×	×	×	×	×	×	×
	SW0DNF-ANU-B	○	×	×	×	×	×	×	×
	SW1DNF-ANU-B	○	○	×	×	×	×	×	×
Q81BD-J61BT11	SW1DNC-CCBD2-B	×	○	○	×	○	○	○	○
Q80BD-J71GP21-SX Q80BD-J71GP21S-SX	SW1DNC-MNETG-B	×	○	○	○	○	△ (1.02C)	△ (1.11M)	△ (1.11M)

NT 4.0: Windows NT®   Win 2000: Windows® 2000
XP Pro: Windows® XP Professional   XP Home: Windows® XP Home Edition
Server 2003: Windows Server® 2003 R2   Vista: Windows Vista®
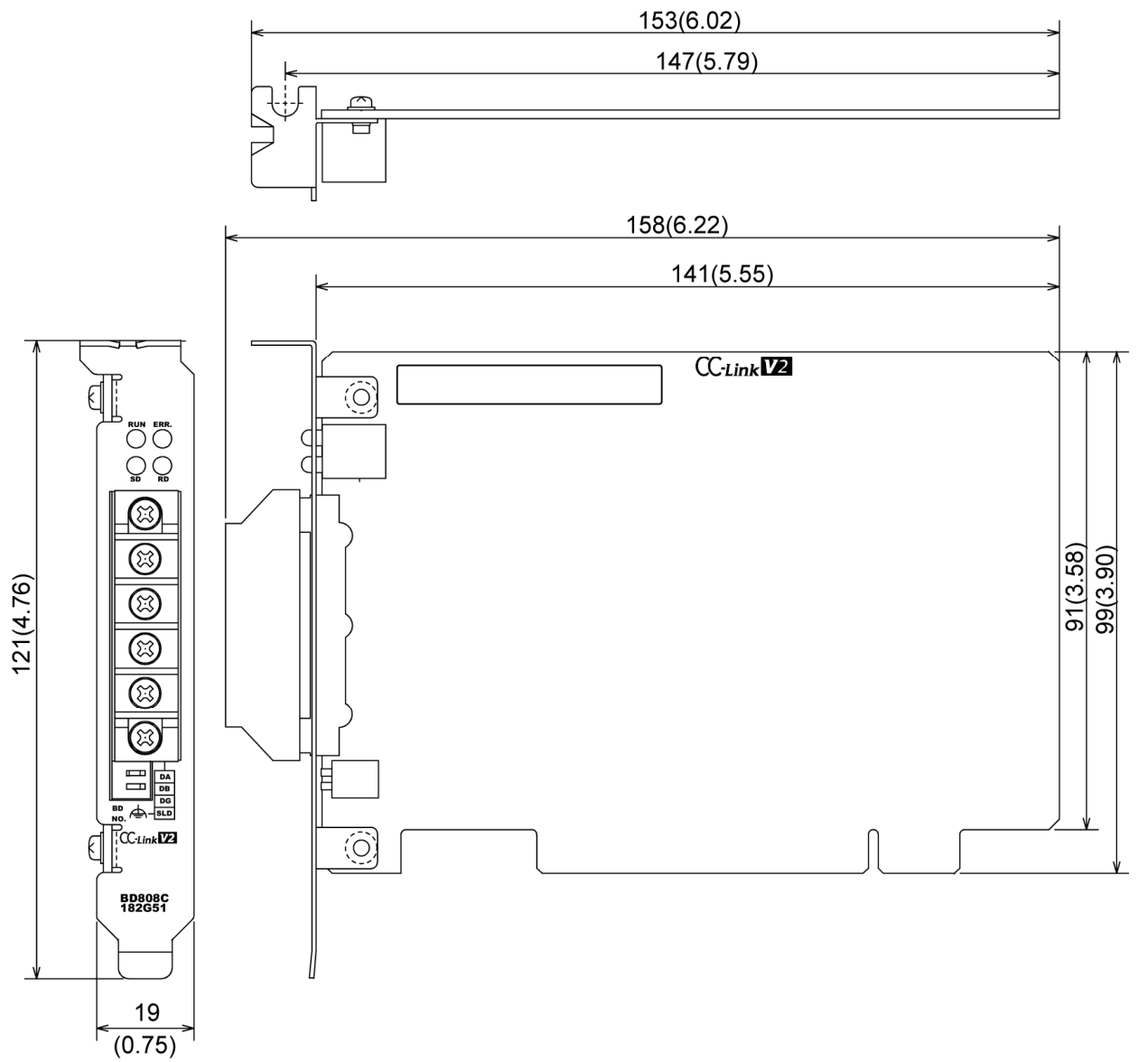Server 2008: Windows Server® 2008   Win 7: Windows® 7

○ : Valid combination.

△ : Operable simultaneously for versions indicated in the parentheses or later.

× : Invalid combination.

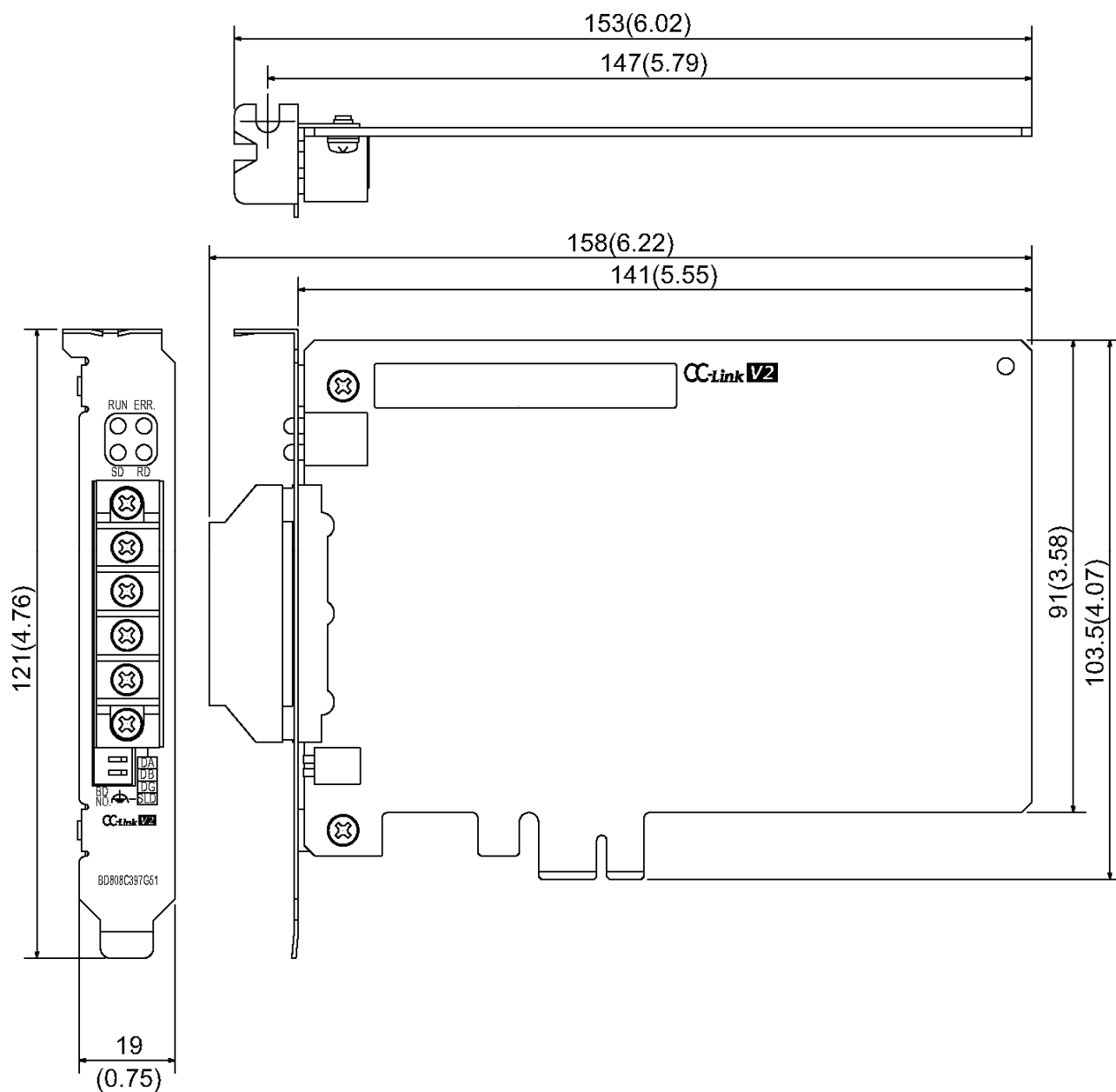＊1: The user program EXE file using the MD function library must be re-linked to the MD function library supplied with the SW1DNC-CCBD2-B.

(2) When using the CC-Link Ver.2 board (Q81BD-J61BT11) and other interface boards in the same PC

Board model name	Software package name	SW1DNC-CCBD2-B						
		Supported OS						
		Win 2000	XP Pro	XP Home	Server 2003	Vista	Server 2008	Win 7
Q80BD-J71LP21-25	SW0DNC-MNETH	○	×	×	×	×	×	×
Q80BD-J71LP21-25 Q80BD-J71BR11 Q80BD-J71LP21G Q80BD-J71LP21GE Q81BD-J71LP21-25	SW0DNC-MNETH-B	○	△ (70H)	×	○	△ (17T)	△ (21X)	△ (21X)
A80BD-J61BT11 A80BD-J61BT13	SW0DNF-CCLINK	×	×	×	×	×	×	×
	SW1DNF-CCLINK	×	×	×	×	×	×	×
	SW2DNF-CCLINK	×	×	×	×	×	×	×
	SW3DNF-CCLINK	×	×	×	×	×	×	×
	SW4DNF-CCLINK	×	×	×	×	×	×	×
	SW4DNF-CCLINK-B	×	×	×	×	×	×	×
A80BD-A2USH-S1	SW0DNF-ANU	×	×	×	×	×	×	×
	SW0DNF-ANU-B	×	×	×	×	×	×	×
	SW1DNF-ANU-B	○	×	×	×	×	×	×
Q80BD-J71GP21-SX Q80BD-J71GP21S-SX	SW1DNC-MNETG-B	○	○	○	○	△ (1.02C)	△ (1.11M)	△ (1.11M)

Win 2000: Windows® 2000   XP Pro: Windows® XP Professional
XP Home: Windows® XP Home Edition   Server 2003: Windows Server® 2003 R2
Vista: Windows Vista®   Server 2008: Windows Server® 2008
Win 7:   Windows® 7

○ : Valid combination.

△: Operable simultaneously for versions indicated in the parentheses or later.

× : Invalid combination.

(3) When using the CC-Link Ver.2 board (Q80BD-J61BT11N) and
     communication support software tools or GX Developer in the
     same PC

Board model name	Software package name	SW1DNC-CCBD2-B							
		Supported OS							
		NT 4.0	Win 2000	XP Pro	XP Home	Server 2003	Vista	Server 2008	Win 7
Communication Support Software Tool	SW1D5F-CSKP-E	✕	✕	✕	✕	✕	✕	✕	✕
	SW2D5F-CSKP-E	○	✕	✕	✕	✕	✕	✕	✕
	SW2D5F-OLEX-E	○	✕	✕	✕	✕	✕	✕	✕
	SW2D5F-XMOP-E	○	✕	✕	✕	✕	✕	✕	✕
	SW3D5F-CSKP-E	○	✕	✕	✕	✕	✕	✕	✕
	SW3D5F-OLEX-E	○	✕	✕	✕	✕	✕	✕	✕
	SW3D5F-XMOP-E	○	✕	✕	✕	✕	✕	✕	✕
	SW0D5C-ACT-E	○	✕	✕	✕	✕	✕	✕	✕
	SW2D5C-ACT-E	○	○	✕	✕	✕	✕	✕	✕
	SW3D5C-ACT-E	○	○	○	○	✕	△ (3.09K)	✕	△ (3.14Q)
	SW1D5C-SHEET-E	○	○	○	○	✕	△ (1.08J)	✕	△ (1.10L)
GX Developer	SW2D5F-GPPW-E	✕	✕	✕	✕	✕	✕	✕	✕
	SW3D5F-GPPW-E	○	✕	✕	✕	✕	✕	✕	✕
	SW4D5C-GPPW-E	○	✕	✕	✕	✕	✕	✕	✕
	SW5D5C-GPPW-E	○	✕	✕	✕	✕	✕	✕	✕
	SW6D5C-GPPW-E	○	✕	✕	✕	✕	✕	✕	✕
	SW7D5C-GPPW-E	○	○	✕	✕	✕	✕	✕	✕
	SW8D5C-GPPW-E	○	○	○	✕	✕	△ (8.58L)	✕	△ (8.91V)

NT 4.0:   Windows NT®   Win 2000: Windows® 2000
XP Pro: Windows® XP Professional   XP Home: Windows® XP Home Edition
Server 2003: Windows Server® 2003 R2   Vista: Windows Vista®
Server 2008: Windows Server® 2008   Win 7:   Windows® 7

○ :Valid combination.

△: Operable simultaneously for versions indicated in the parentheses or later.

✕ : Invalid combination.

(4) When using the CC-Link Ver.2 board (Q81BD-J61BT11) and communication support software tools or GX Developer in the same PC

Board model name	Software package name	SW1DNC-CCBD2-B						
		Supported OS						
		Win 2000	XP Pro	XP Home	Server 2003	Vista	Server 2008	Win 7
Communication Support Software Tool	SW1D5F-CSKP-E	×	×	×	×	×	×	×
	SW2D5F-CSKP-E	×	×	×	×	×	×	×
	SW2D5F-OLEX-E	×	×	×	×	×	×	×
	SW2D5F-XMOP-E	×	×	×	×	×	×	×
	SW3D5F-CSKP-E	×	×	×	×	×	×	×
	SW3D5F-OLEX-E	×	×	×	×	×	×	×
	SW3D5F-XMOP-E	×	×	×	×	×	×	×
	SW0D5C-ACT-E	×	×	×	×	×	×	×
	SW2D5C-ACT-E	○	×	×	×	×	×	×
	SW3D5C-ACT-E	○	○	○	×	△ (3.09K)	×	△ (3.14Q)
	SW1D5C-SHEET-E	○	○	○	×	△ (1.08J)	×	△ (1.10L)
GX Developer	SW2D5F-GPPW-E	×	×	×	×	×	×	×
	SW3D5F-GPPW-E	×	×	×	×	×	×	×
	SW4D5C-GPPW-E	×	×	×	×	×	×	×
	SW5D5C-GPPW-E	×	×	×	×	×	×	×
	SW6D5C-GPPW-E	×	×	×	×	×	×	×
	SW7D5C-GPPW-E	○	×	×	×	×	×	×
	SW8D5C-GPPW-E	○	○	○	×	△ (8.58L)	×	△ (8.91V)

Win 2000: Windows® 2000   XP Pro: Windows® XP Professional
XP Home: Windows® XP Home Edition   Server 2003: Windows Server® 2003 R2
Vista: Windows Vista®   Server 2008: Windows Server® 2008
Win 7:   Windows® 7

○ :Valid combination.

△: Operable simultaneously for versions indicated in the parentheses or later.

× : Invalid combination.

Appendix 9 External Dimensions

Appendix 9.1 Q80BD-J61BT11N

Unit mm (inch)

Appendix 9.2 Q81BD-J61BT11

153(6.02)

147(5.79)

158(6.22)

141(5.55)

91(3.58)

103.5(4.07)

121(4.76)

RUN ERR.

SD RD

CC-Link V2

CC-Link V2

BD808C397G51

19

(0.75)

Unit mm (inch)

Appendix 10 Setting Checklists

Some kinds of sheets are provided in this section for setting the parameters required for the CC-Link system configuration.
Make photocopies and use them as needed.

Appendix 10.1 Parameter setting checklist

Parameter Setting Check List

Setting item		Setting range/Item	
Channel No.		Channel No. 81 / Channel No.82 Channel No. 83 / Channel No.84	
Sta. No./Type		No.	Master station / Local station / Standby master station
Transmission rate		156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps	
Mode		Remote net [Ver.1 mode] / Remote net [Ver.2 mode] Remote net [Additional mode] / Off line	
Operation settings	Expanded cyclic	Single / Double / Quadruple / Octuple	
	Occupied Sta.	Occupies 1 station / Occupies 2 stations Occupies 3 stations / Occupies 4 stations	
	Input for Err Sta.	Hold / Clear	
Other Settings	Retry count	Times	
	Automatic reconnection station count	Modules	
	Standby master station No.	No.	
	Delay information setting	× 50 micro sec	
	WDT setting	× 8 ms	
Station information settings	All connect count	Modules	

Appendix 10.2 Station information setting checklist

Station information setting checklist

Sta. No.	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/invalid station select	Intelligent buffer select (word)		
						Send	Receive	Automatic
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
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24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								

Sta. No.	Station type	Expanded cyclic	Occupied Sta.	Remote station points	Reserve/invalid station select	Intelligent buffer select (word)		
						Send	Receive	Automatic
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
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Appendix 10.3 Device assignment checklist

Device assignment checklist

No.	RX	RY	RWw	RWr
1	RX00 to RX1F→	RY00 to RY1F→	RWw0 to RWw3→	RWr0 to RWr3→
2	RX20 to RX3F→	RY20 to RY3F→	RWw4 to RWw7→	RWr4 to RWr7→
3	RX40 to RX5F→	RY40 to RY5F→	RWw8 to RWwB→	RWr8 to RWrB→
4	RX60 to RX7F→	RY60 to RY7F→	RWwC to RWwF→	RWrC to RWrF→
5	RX80 to RX9F→	RY80 to RY9F→	RWw10 to RWw13→	RWr10 to RWr13→
6	RXA0 to RXBF→	RYA0 to RYBF→	RWw14 to RWw17→	RWr14 to RWr17→
7	RXC0 to RXDF→	RYC0 to RYDF→	RWw18 to RWw1B→	RWr18 to RWr1B→
8	RXE0 to RXFF→	RYE0 to RYFF→	RWw1C to RWw1F→	RWr1C to RWr1F→
9	RX100 to RX11F→	RY100 to RY11F→	RWw20 to RWw23→	RWr20 to RWr23→
10	RX120 to RX13F→	RY120 to RY13F→	RWw24 to RWw27→	RWr24 to RWr27→
11	RX140 to RX15F→	RY140 to RY15F→	RWw28 to RWw2B→	RWr28 to RWr2B→
12	RX160 to RX17F→	RY160 to RY17F→	RWw2C to RWw2F→	RWr2C to RWr2F→
13	RX180 to RX19F→	RY180 to RY19F→	RWw30 to RWw33→	RWr30 to RWr33→
14	RX1A0 to RX1BF→	RY1A0 to RY1BF→	RWw34 to RWw37→	RWr34 to RWr37→
15	RX1C0 to RX1DF→	RY1C0 to RY1DF→	RWw38 to RWw3B→	RWr38 to RWr3B→
16	RX1E0 to RX1FF→	RY1E0 to RY1FF→	RWw3C to RWw3F→	RWr3C to RWr3F→
17	RX200 to RX21F→	RY200 to RY21F→	RWw40 to RWw43→	RWr40 to RWr43→
18	RX220 to RX23F→	RY220 to RY23F→	RWw44 to RWw47→	RWr44 to RWr47→
19	RX240 to RX25F→	RY240 to RY25F→	RWw48 to RWw4B→	RWr48 to RWr4B→
20	RX260 to RX27F→	RY260 to RY27F→	RWw4C to RWw4F→	RWr4C to RWr4F→
21	RX280 to RX29F→	RY280 to RY29F→	RWw50 to RWw53→	RWr50 to RWr53→
22	RX2A0 to RX2BF→	RY2A0 to RY2BF→	RWw54 to RWw57→	RWr54 to RWr57→
23	RX2C0 to RX2DF→	RY2C0 to RY2DF→	RWw58 to RWw5B→	RWr58 to RWr5B→
24	RX2E0 to RX2FF→	RY2E0 to RY2FF→	RWw5C to RWw5F→	RWr5C to RWr5F→
25	RX300 to RX31F→	RY300 to RY31F→	RWw60 to RWw63→	RWr60 to RWr63→
26	RX320 to RX33F→	RY320 to RY33F→	RWw64 to RWw67→	RWr64 to RWr67→
27	RX340 to RX35F→	RY340 to RY35F→	RWw68 to RWw6B→	RWr68 to RWr6B→
28	RX360 to RX37F→	RY360 to RY37F→	RWw6C to RWw6F→	RWr6C to RWr6F→
29	RX380 to RX39F→	RY380 to RY39F→	RWw70 to RWw73→	RWr70 to RWr73→
30	RX3A0 to RX3BF→	RY3A0 to RY3BF→	RWw74 to RWw77→	RWr74 to RWr77→
31	RX3C0 to RX3DF→	RY3C0 to RY3DF→	RWw78 to RWw7B→	RWr78 to RWr7B→
32	RX3E0 to RX3FF→	RY3E0 to RY3FF→	RWw7C to RWw7F→	RWr7C to RWr7F→
33	RX400 to RX41F→	RY400 to RY41F→	RWw80 to RWw83→	RWr80 to RWr83→
34	RX420 to RX43F→	RY420 to RY43F→	RWw84 to RWw87→	RWr84 to RWr87→
35	RX440 to RX45F→	RY440 to RY45F→	RWw88 to RWw8B→	RWr88 to RWr8B→
36	RX460 to RX47F→	RY460 to RY47F→	RWw8C to RWw8F→	RWr8C to RWr8F→
37	RX480 to RX49F→	RY480 to RY49F→	RWw90 to RWw93→	RWr90 to RWr93→
38	RX4A0 to RX4BF→	RY4A0 to RY4BF→	RWw94 to RWw97→	RWr94 to RWr97→
39	RX4C0 to RX4DF→	RY4C0 to RY4DF→	RWw98 to RWw9B→	RWr98 to RWr9B→
40	RX4E0 to RX4FF→	RY4E0 to RY4FF→	RWw9C to RWw9F→	RWr9C to RWr9F→
41	RX500 to RX51F→	RY500 to RY51F→	RWwA0 to RWwA3→	RWrA0 to RWrA3→
42	RX520 to RX53F→	RY520 to RY53F→	RWwA4 to RWwA7→	RWrA4 to RWrA7→
43	RX540 to RX55F→	RY540 to RY55F→	RWwA8 to RWwAB→	RWrA8 to RWrAB→
44	RX560 to RX57F→	RY560 to RY57F→	RWwAC to RWwAF→	RWrAC to RWrAF→

No.	RX	RY	RWw	RWr
45	RX580 to RX59F →	RY580 to RY59F →	RWwB0 to RWwB3 →	RWrB0 to RWrB3 →
46	RX5A0 to RX5BF →	RY5A0 to RY5BF →	RWwB4 to RWwB7 →	RWrB4 to RWrB7 →
47	RX5C0 to RX5DF →	RY5C0 to RY5DF →	RWwB8 to RWwBB →	RWrB8 to RWrBB →
48	RX5E0 to RX5FF →	RY5E0 to RY5FF →	RWwBC to RWwBF →	RWrBC to RWrBF →
49	RX600 to RX61F →	RY600 to RY61F →	RWwC0 to RWwC3 →	RWrC0 to RWrC3 →
50	RX620 to RX63F →	RY620 to RY63F →	RWwC4 to RWwC7 →	RWrC4 to RWrC7 →
51	RX640 to RX65F →	RY640 to RY65F →	RWwC8 to RWwCB →	RWrC8 to RWrCB →
52	RX660 to RX67F →	RY660 to RY67F →	RWwCC to RWwCF →	RWrCC to RWrCF →
53	RX680 to RX69F →	RY680 to RY69F →	RWwD0 to RWwD3 →	RWrD0 to RWrD3 →
54	RX6A0 to RX6BF →	RY6A0 to RY6BF →	RWwD4 to RWwD7 →	RWrD4 to RWrD7 →
55	RX6C0 to RX6DF →	RY6C0 to RY6DF →	RWwD8 to RWwDB →	RWrD8 to RWrDB →
56	RX6E0 to RX6FF →	RY6E0 to RY6FF →	RWwDC to RWwDF →	RWrDC to RWrDF →
57	RX700 to RX71F →	RY700 to RY71F →	RWwE0 to RWwE3 →	RWrE0 to RWrE3 →
58	RX720 to RX73F →	RY720 to RY73F →	RWwE4 to RWwE7 →	RWrE4 to RWrE7 →
59	RX740 to RX75F →	RY740 to RY75F →	RWwE8 to RWwEB →	RWrE8 to RWrEB →
60	RX760 to RX77F →	RY760 to RY77F →	RWwEC to RWwEF →	RWrEC to RWrEF →
61	RX780 to RX79F →	RY780 to RY79F →	RWwF0 to RWwF3 →	RWrF0 to RWrF3 →
62	RX7A0 to RX7BF →	RY7A0 to RY7BF →	RWwF4 to RWwF7 →	RWrF4 to RWrF7 →
63	RX7C0 to RX7DF →	RY7C0 to RY7DF →	RWwF8 to RWwFB →	RWrF8 to RWrFB →
64	RX7E0 to RX7FF →	RY7E0 to RY7FF →	RWwFC to RWwFF →	RWrFC to RWrFF →

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WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.
However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
   1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
   2. Failure caused by unapproved modifications, etc., to the product by the user.
   3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
   4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
   5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
   6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
   7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued.
   Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not , compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

Type Q80BD-J61BT11N/Q81BD-J61BT11 CC-Link System Master/Local Interface Board

User's Manual (For SW1DNC-CCBD2-B)

MODEL	Q80BD-BT11N-SW1-U-E
MODEL CODE	13JR77

SH(NA)-080527ENG-N(1105)KWIX

▲ MITSUBISHI ELECTRIC CORPORATION

When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.